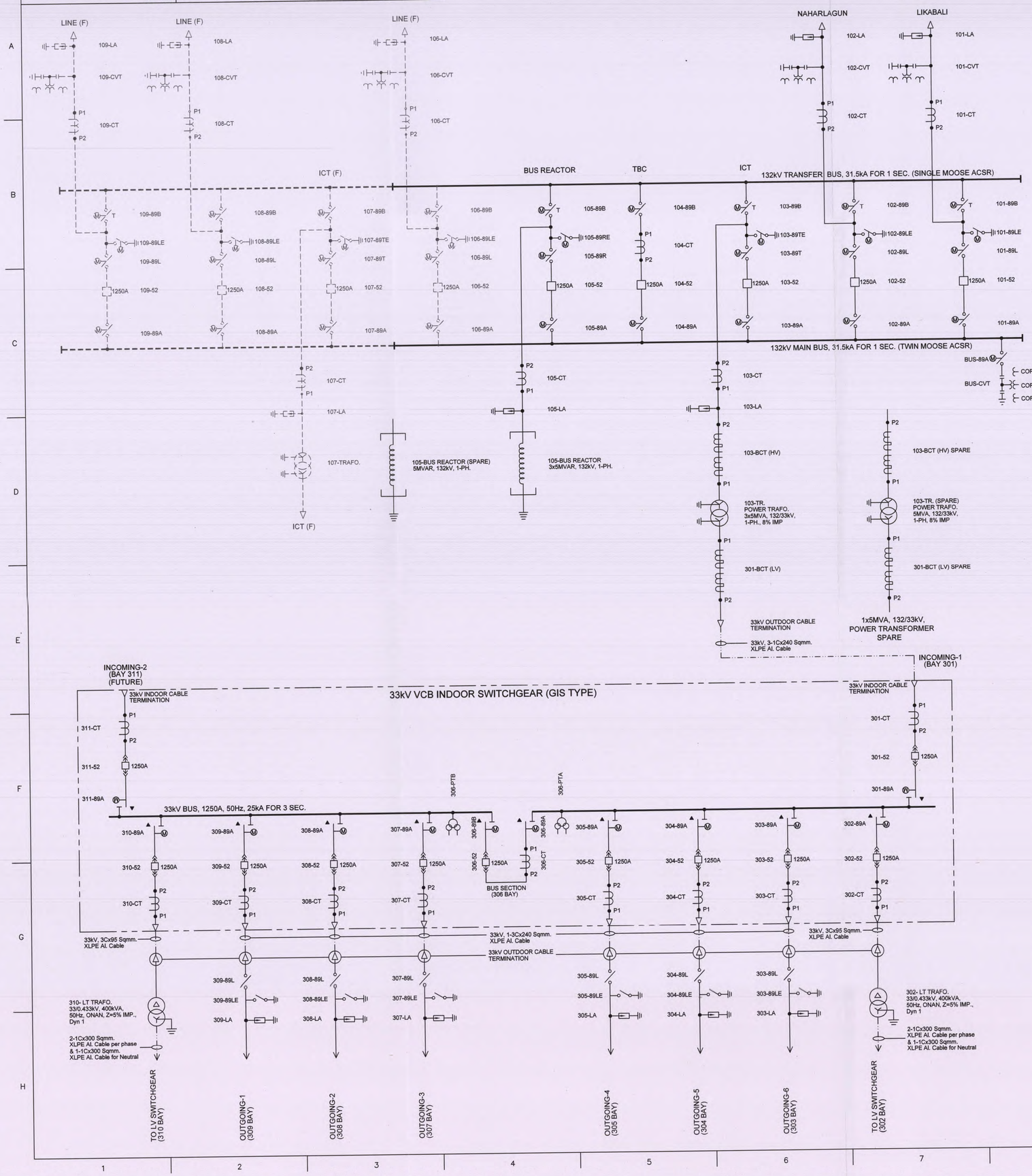
Single Line Diagram

TITLE: SINGLE LINE DIAGRAM OF 132KV/33KV GERUKAMUKH (NEW) SUBSTATION

DWG NO TCE-XXXXX-EL-1006-AU-40003



132kV BILL OF QUANTITY:

SYMBOL	EQUIPMENT DESCRIPTION	RATINGS	EQPT. NO.	QTY.
	CIRCUIT BREAKER (CB) ALONG WITH STRUCTURE	132kV, 3 PH., 1 POLE, SF6 TYPE, 1250A, 31.5kA FOR 1 SEC.	101-52, 102-52, 103-52, 104-52, 105-52	05 SET.
	MOTORISED TANDEM ISOLATOR WITHOUT E/S (HDB)	132kV, 3x1-PH., 1250A, 31.5kV FOR 1 SEC	101-89B, 102-89B, 103-89B, 105-89B	04 SET.
	MOTORISED ISOLATOR WITHOUT E/S (HDB)	132kV, 3 PH., 1250A, 31.5kV FOR 1 SEC	101-89A, 102-89A, 103-89A,104-89A, 104-89B, 105-89A, BUS-89A	07 SET.
	MOTORISED ISOLATOR WITH 1 E/S (HDB)	132kV, 3 PH., 1250A, 31.5kV FOR 1 SEC	101-89L/101-89LE, 102-89L/102-89LE, 103-89T/103-89TE, 105-89R/105-89RE	04 SET.
	CAPACITIVE VOLTAGE TRANSFORMER (CVT)	1-PH., 8800pF, 50VA/CORE 132kV/√3 / 0.11kV/√3 / 0.11kV/√3 3 CORE, CL. 3P,3P,0.2	101-CVT, 102-CVT, BUS-CVT	09 NOS.
	LIGHTNING ARRESTER (LA)	120kV, 1-PH., CLASS-3, 10kA	101-LA, 102-LA, 103-LA, 105-LA	12 NOS.
	POWER TRANSFORMER	1-PH., 132/33kV, 50Hz, 5MVA, YNyno, Z=8% IMP., ONAN	103-TR., 103-TR (SPARE)	04 NOS.
	BUS REACTOR	1-PH., 132kV, 50Hz, 5MVAR, ONAN	105-BUS REACTOR, 105-BUS REACTOR (SPARE)	04 NOS.
	132kV, 300A, CURRENT TRANSFORMER (CT) (120% EXTENDED RATING)	CORE-1 300-150-75/1A, CL. 0.2S, 20VA, ISF<5	103-CT, 105-CT	06 NOS.
		CORE-2 300-150-75/1A, CL. PX, Vk=300/150/75V, Rct=5/2.5/1.25Ω, Imet=30/60/120mA AT Vk		
		CORE-3 300-150-75/1A, CL. PX, Vk=300/150/75V, Rct=5/2.5/1.25Ω, Imet=30/60/120mA AT Vk		
		CORE-4 300-150-75/1A, CL. PX, Vk=300/150/75V, Rct=5/2.5/1.25Ω, Imet=30/60/120mA AT Vk		
		CORE-5 300-150-75/1A, CL. PX, Vk=300/150/75V, Rct=5/2.5/1.25Ω, Imet=30/60/120mA AT Vk		
	132kV, 600A, CURRENT TRANSFORMER (CT) (120% EXTENDED RATING)	CORE-1 600-300-150/1A, CL. 0.2S, 20VA, ISF<5	101-CT, 102-CT, 104-CT	09 NOS.
		CORE-2 600-300-150/1A, CL. PX, Vk=600/300/150V, Rct=6/3/1.5Ω, Imet=30/60/120mA AT Vk		
		CORE-3 600-300-150/1A, CL. PX, Vk=600/300/150V, Rct=6/3/1.5Ω, Imet=30/60/120mA AT Vk		
		CORE-4 600-300-150/1A, CL. PX, Vk=600/300/150V, Rct=6/3/1.5Ω, Imet=30/60/120mA AT Vk		
		CORE-5 600-300-150/1A, CL. PX, Vk=600/300/150V, Rct=6/3/1.5Ω, Imet=30/60/120mA AT Vk		

33kV BILL OF QUANTITY (INDOOR GIS):

FIGURE	EQUIPMENT DESCRIPTION	RATINGS	BAY NO.	QTY.
	33kV LINE MODULE	1250A, 25kA FOR 3 SEC.	303, 304, 305, 307, 308, 309	06 SET
	33kV TRANSFORMER MODULE	1250A, 25kA FOR 3 SEC.	301, 311	02 SET
	33kV LT TRANSFORMER MODULE	1250A, 25kA FOR 3 SEC.	302, 310	02 SET
	33kV BUS SECTIONALISER MODULE WITH VT MODULE	1250A, 25kA FOR 3 SEC.	306	01 SET

TECHNICAL DATA FOR 33kV GIS CT & VT:

SYMBOL	EQUIPMENT DESCRIPTION	RATINGS	EQPT. NO.
	VOLTAGE TRANSFORMER (VT) MODULE	33kV/√3 / 0.11kV/√3 / 0.11kV/√3 2 CORE, 5VA, CL. 0.5,3P	306-PTA, 306-PTB
	CURRENT TRANSFORMER (CT) FOR LINE BAY MODULE	CORE-1 300-150/1A, CL. 0.5S, 7.5VA	303-CT, 304-CT, 305-CT, 307-CT, 308-CT, 309-CT
		CORE-2 300-150/1A, CL. 5P20	
	CURRENT TRANSFORMER (CT) FOR TRAFO. INCOMER BAY MODULE	CORE-1 1000-500/1A, CL. 0.5S, 7.5VA	301-CT, 311-CT
		CORE-2 1000-500/1A, CL. 5P20	
		CORE-3 1000-500/1A, CL. PS, Vk=400V	
	CURRENT TRANSFORMER (CT) FOR LT TRAFO. BAY MODULE	CORE-1 40-20/1A, CL. 0.5S, 7.5VA	302-CT, 310-CT
		CORE-2 40-20/1A, CL. 5P20	
	CURRENT TRANSFORMER (CT) FOR BUS COUPLER MODULE	CORE-1 1000-500/1A, CL. 0.5S, 7.5VA	306-CT
		CORE-2 1000-500/1A, CL. 5P20	
		CORE-3 1000-500/1A, CL. 5P20	

REFER NOTE-7

LEGEND

- PRESENT SCOPE
- FUTURE SCOPE (F)
- CABLE

VOLTAGE LEVEL (1-132kV, 3-33kV)
BAY NO.
EQUIPMENT IDENTIFICATION NUMBER. (89-ISO, 52-CB)
LOCATION (A-MAIN BUS & B-TRF. BUS, L-LINE SIDE, T-TRANSFORMER SIDE, R-REACTOR SIDE)
EARTH SWITCH
SYMBOL (A,B)

1	07	89	A	E	A

T TANDEM ISOLATOR
S SPARE UNIT

SYSTEM PARAMETER

S. NO.	VOLTAGE LEVEL	132kV	33kV
1.	SYSTEM RATED VOLTAGE	132kV	33kV
2.	MAX. RATED VOLTAGE (Vrms.)	145kV	36kV
3.	RATED FREQUENCY	50Hz	50Hz
4.	NO. OF PHASE	3	3
5.	RATED INSULATION LEVEL		
	a) FULL WAVE IMPULSE WITHSTAND VOLTAGE (1.2/50 MICROSEC.)	650kVp	170kVp
	b) ONE MINUTE POWER FREQUENCY DRY AND WET WITHSTAND VOLTAGE (kVrms.)	275 kV	70 kV
6.	RATED SHORT CIRCUIT CURRENT	31.5 kA FOR 1 SEC.	25 kA FOR 3 SEC.
7.	SYSTEM NEUTRAL GROUNDING	EFFECTIVELY EARTHED	EFFECTIVELY EARTHED

33kV BILL OF QUANTITY (AIS):

SYMBOL	EQUIPMENT DESCRIPTION	RATINGS	EQPT. NO.	QTY.
	LT TRANSFORMER	33/0.433kV, 400kVA, 50Hz, ONAN, Z=5% IMP., Dyn 1	302-LT TRAFO., 310-LT TRAFO.	02 NOS.
	ISOLATOR WITH 1 E/S (MANUAL)	33kV, OUTDOOR TYPE, 1250A	303-89L/303-89LE, 304-89L/304-89LE, 305-89L/305-89LE, 307-89L/307-89LE, 308-89L/308-89LE, 309-89L/309-89LE	06 NOS.
	LIGHTNING ARRESTER (LA)	30kV, CLASS-2, 10kA	303-LA, 304-LA, 305-LA, 307-LA, 308-LA, 309-LA	18 NOS.

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. 145kV CIRCUIT BREAKER SHALL BE SUITABLE FOR BOTH 1 PHASE AND 3 PHASE AUTO RECLOSING.
3. ALL 33kV EARTH SWITCH ARE MANUAL OPERATED.
4. 132/33kV SPARE TRANSFORMER UNIT SHALL BE PHYSICALLY SHIFT TO REPLACE FAULTY UNIT.
5. 132kV SPARE BUS REACTOR UNIT SHALL BE PHYSICALLY SHIFTED TO REPLACE FAULTY UNIT.
6. 33kV OUTDOOR DISCONNECTOR IS MANUAL OPERATED.
7. THE RATING FOR INSTRUMENT TRANSFORMER (33kV GIS) ARE TENTATIVE ONLY & MAY CHANGE TO MEET THE FUNCTIONAL REQUIREMENTS.

REFERENCE DRAWING

1. SINGLE LINE DIAGRAM OF GERUKAMUKH - C/ENGG/NER/ARP/GERUKAMUKH/SLD/01

Rev. No.	Date	Description	Prepared	Checked	Approved
R2	28.05.2019	REVISED AS PER PGCIL COMMENTS DTD. 20.09.18	SK	AD	DB
R1	05.09.2018	REVISED AS PER PGCIL COMMENTS DTD. 24.08.18	SK	AD	DB

PROJECT: CC-CS/165-NER/SS-3767/3/G4/NOA-I/7648 & CC-CS/165-NER/SS-3767/3/G4/NOA-II/7649 BOTH DATED 09.04.2018 (SUPPLY & ERECTION) FOR SUBSTATION PACKAGE SS01B UNDER COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION & DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH

EMPLOYER'S CONSULTANT: POWER GRID CORPORATION OF INDIA LIMITED (A GOVERNMENT OF INDIA ENTERPRISE)

CONTRACTOR: TATA PROJECTS LTD. TOWER-1, FIRST FLOOR, OKAYA CENTER, PLOT NO. B-5 SECTOR-62, NOIDA

TITLE: SINGLE LINE DIAGRAM OF 132kV/33kV GERUKAMUKH (NEW) SUBSTATION

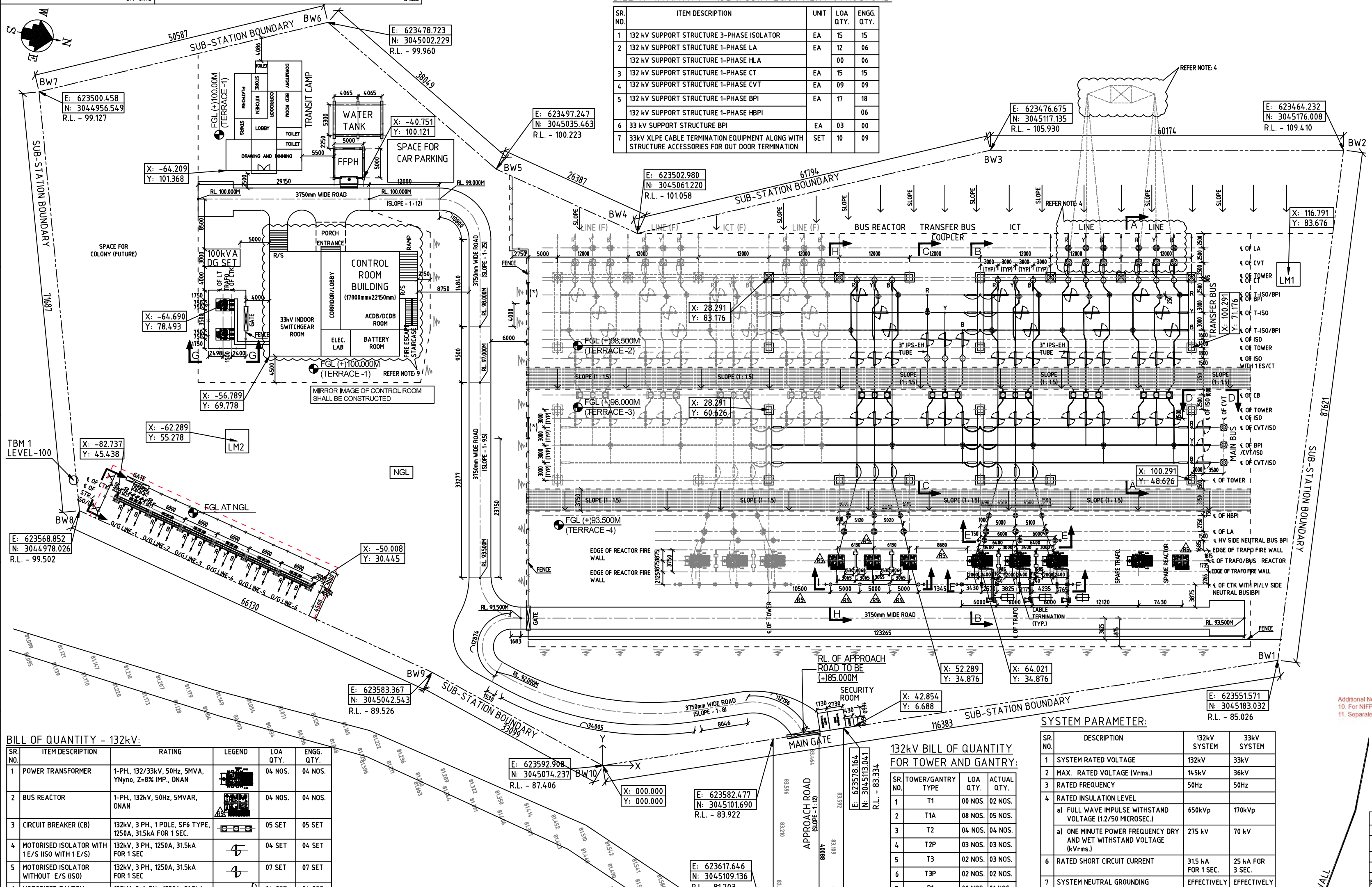
TATA CONSULTING ENGINEERS LIMITED MUMBAI

SCALE: NTS	APPROVED	DATE (RO ISSUE)	03.08.2018
DEL.CENTRE-DISC: EL		DATE (CURRENT ISSUE)	28.05.2019
Prepared By: SK			
Checked By: AD			
Approved By: DB	DWG NO TCE-XXXXX-EL-1006-AU-40003	ISSUE	R2

SIZE-A1

Overall Substation Layout Plan

TITLE: OVERALL SUBSTATION LAYOUT PLAN AND SECTION FOR 132kV/33kV GERUKAMUKH SUBSTATION
DWG NO TCE.11207A-EL-4004-GA-42001



BILL OF QUANTITY - 132 & 33kV EQUIPMENT STRUCTURE:

SR. NO.	ITEM DESCRIPTION	UNIT	LOA QTY.	ENGG. QTY.
1	132 kV SUPPORT STRUCTURE 3-PHASE ISOLATOR	EA	15	15
2	132 kV SUPPORT STRUCTURE 1-PHASE LA	EA	12	06
	132 kV SUPPORT STRUCTURE 1-PHASE HLA		00	06
3	132 kV SUPPORT STRUCTURE 1-PHASE CT	EA	15	15
4	132 kV SUPPORT STRUCTURE 1-PHASE CVT	EA	09	09
5	132 kV SUPPORT STRUCTURE 1-PHASE BPI	EA	17	18
	132 kV SUPPORT STRUCTURE 1-PHASE HBPI			06
6	33 kV SUPPORT STRUCTURE BPI	EA	03	00
7	33kV XLPE CABLE TERMINATION EQUIPMENT ALONG WITH STRUCTURE ACCESSORIES FOR OUT DOOR TERMINATION	SET	10	09

LEGEND

- FENCE
- BOUNDARY WALL
- SHIELD WIRE
- LEVEL MARKUP
- (*) 3.5m WIDE SINGLE PANEL OPENABLE TYPE CHAIN LINK FENCE — Any modification in fence to be done at site as per instruction of POWERGRID site incharge (if required)
- TOWER WITH PEAK
- TOWER WITHOUT PEAK
- SLOPE MARK
- LM — LIGHTNING MAST
- FGL (+)100.000M — TERRACE-1
- FGL (+)98.500M — TERRACE-2
- FGL (+)96.000M — TERRACE-3
- FGL (+)93.500M — TERRACE-4

BILL OF QUANTITY (GIS) - 33kV

	EQUIPMENT DESCRIPTION	RATINGS	ENGG. QTY.
1	33kV LINE MODULE	1250A, 25kA FOR 3 SEC.	06 SET
2	33kV TRANSFORMER MODULE	1250A, 25kA FOR 3 SEC.	02 SET
3	33kV LT TRANSFORMER MODULE	1250A, 25kA FOR 3 SEC.	02 SET
4	33kV BUS SECTIONALISER MODULE WITH VT MODULE	1250A, 25kA FOR 3 SEC.	01 SET

NOTES:

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
2. SWITCHYARD IS DIVIDED IN FOUR LEVELS. CRB, TRANSIT CAMP & FFPH IS AT 100.0m, 132kV SWITCHYARD IS AT 98.5m & 96.0m AND ICT'S IS AT 93.5M.
3. REFER CIVIL DRAWING FOR DETAILS OF SLOPE IN YARD & ROADS ETC.
4. 132kV LINE SIDE EQUIPMENTS OF LA & CVT LOCATION IS FINALIZED CONSIDERING 10° DEVIATION TO INCOMER LINE COMING FROM DEAD END TOWER.
5. FGL OF GUARD HOUSE SHALL BE FINALIZED LOCALLY AT SITE.
6. FGL OF 33kV LINE GANTRY YARD AREA SHALL BE MATCH WITH NGL AT SITE.
7. SEPARATE DRAWING WILL BE SUBMITTED FOR NIFPS.
8. THE LOCATION OF NIFPS TANK IS TENTATIVE.
9. MIRROR IMAGE OF CONTROL BUILDING SHALL BE CONSTRUCTED BY TATA.

Additional Note:
10. For NIFPS, Separate NIFPS Location Layout drawing shall be referred for NIFPS Location.
11. Separate drawing shall be referred for Retaining wall Location and its details.

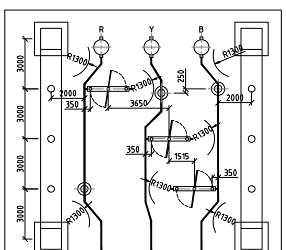
GERUKAMUKH (NEW) SUBSTATION - TCE-11207A-EL-1006-AU-40003
2. CONTOUR LAYOUT DRAWING FOR 132/33KV S/S AT GERUKAMUKH - TPL/PGCIL/GERU KA MUKH SS/001
3. GA ARRANGEMENT DRAWING OF 5MVAr, SHUNT REACTOR - PC0300876/01/01

BILL OF QUANTITY - 132kV:

SR. NO.	ITEM DESCRIPTION	RATING	LEGEND	LOA QTY.	ENGG. QTY.
1	POWER TRANSFORMER	1-PH., 132/33kV, 50Hz, 5MVA, YNyno, Z=8% IMP., ONAN		04 NOS.	04 NOS.
2	BUS REACTOR	1-PH., 132kV, 50Hz, 5MVAR, ONAN		04 NOS.	04 NOS.
3	CIRCUIT BREAKER (CB)	132kV, 3 PH., 1 POLE, SF6 TYPE, 1250A, 31.5kA FOR 1 SEC.		05 SET	05 SET
4	MOTORISED ISOLATOR WITH 1 E/S (ISO WITH 1 E/S)	132kV, 3 PH., 1250A, 31.5kA FOR 1 SEC		04 SET	04 SET
5	MOTORISED ISOLATOR WITHOUT E/S (ISO)	132kV, 3 PH., 1250A, 31.5kA FOR 1 SEC		07 SET	07 SET
6	MOTORISED TANDEM ISOLATOR WITHOUT E/S (T-ISO)	132kV, 3x1-PH., 1250A, 31.5kA FOR 1 SEC		04 SET	04 SET
7	CURRENT TRANSFORMER (CT), 120% EXTENDED RATING	132kV, 1 PH., 300A		06 NOS.	06 NOS.
		132kV, 1 PH., 600A		09 NOS.	09 NOS.
8	CAPACITIVE VOLTAGE TRANSFORMER (CVT)	1-PH., 8800pF		09 NOS.	09 NOS.
9	SURGE ARRESTER (LA)	120kV, 1-PH., CLASS-3, 10kA		12 NOS.	12 NOS.
10	BUS POST INSULATOR (BPI)	1-Ph, 132kV		17 NOS.	24 NOS.

BILL OF QUANTITY (AIS) - 33kV:

SR. NO.	ITEM DESCRIPTION	RATING	LEGEND	LOA QTY.	ENGG. QTY.
1	LT TRANSFORMER	33/0.433kV, 400kVA, 50Hz, ONAN, Z=5% IMP., Dyn 1		02 NOS.	02 NOS.
2	33kV CABLE TERMINATION KIT ALONG WITH STRUCTURE & ACCESSORIES (CTK)	33kV, OUTDOOR TYPE		10 SET	09 SET
3	LIGHTNING ARRESTER (LA)	30kV, CLASS-2, 10kA		18 NOS.	18 NOS.
4	ISOLATOR WITH 1 E/S (MANUAL)	33kV, OUTDOOR TYPE, 1250A		06 SET	06 SET
5	33kV POST INSULATOR	33kV, OUTDOOR TYPE		03 NOS.	03 NOS.



DETAIL-A FOR 132kV TANDEM ISOLATOR ARRANGEMENT
(SCALE 1:150)

CONDUCTOR DETAILS:

SR. NO.	ITEM DESCRIPTION	CONDUCTOR DETAILS
1	132kV MAIN BUS	TWIN MOOSE ACSR
2	132kV TRANSFER BUS	SINGLE MOOSE ACSR
3	132kV JACK BUS/JUMPERS	SINGLE MOOSE ACSR
4	132kV EQUIPMENT INTERCONNECTION	3" IPS-EH AL. TUBE /SINGLE MOOSE ACSR
5	33kV FEEDERS	SINGLE MOOSE ACSR FOR TRANSFORMER & SINGLE PANTHER FOR LINE BAY
6	33kV EQUIPMENT INTERCONNECTION	3" IPS-EH AL. TUBE & SINGLE PANTHER FOR LINE BAY/SINGLE MOOSE ACSR FOR TRANSFORMER

132kV BILL OF QUANTITY FOR TOWER AND GANTRY:

SR. NO.	TOWER/GANTRY TYPE	LOA QTY.	ACTUAL QTY.
1	T1	00 NOS.	02 NOS.
2	T1A	08 NOS.	05 NOS.
3	T2	04 NOS.	04 NOS.
4	T2P	03 NOS.	03 NOS.
5	T3	02 NOS.	03 NOS.
6	T3P	02 NOS.	02 NOS.
7	B1	00 NOS.	01 NOS.
8	B1A	00 NOS.	12 NOS.
9	B1AA	13 NOS.	00 NOS.
10	LM	02 NOS.	02 NOS.

33kV BILL OF QUANTITY FOR TOWER AND GANTRY:

SR. NO.	TOWER/GANTRY TYPE	LOA QTY.	ACTUAL QTY.
1	C2PA	07 NOS.	07 NOS.
2	B2A	06 NOS.	06 NOS.
3	B4	06 NOS.	06 NOS.

SYSTEM PARAMETER:

SR. NO.	DESCRIPTION	132kV SYSTEM	33kV SYSTEM
1	SYSTEM RATED VOLTAGE	132kV	33kV
2	MAX. RATED VOLTAGE (Vrms.)	145kV	36kV
3	RATED FREQUENCY	50Hz	50Hz
4	RATED INSULATION LEVEL		
	a) FULL WAVE IMPULSE WITHSTAND VOLTAGE (1.2/50 MICROSEC.)	650kVp	170kVp
	a) ONE MINUTE POWER FREQUENCY DRY AND WET WITHSTAND VOLTAGE (kVrms.)	275 kV	70 kV
6	RATED SHORT CIRCUIT CURRENT	31.5 kA FOR 1 SEC.	25 kA FOR 3 SEC.
7	SYSTEM NEUTRAL GROUNDING	EFFECTIVELY EARTHED	EFFECTIVELY EARTHED

CLEARANCES:

SR. NO.	DESCRIPTION	132kV SYSTEM	33kV SYSTEM
1	PHASE TO PHASE (mm)	1300	320
2	PHASE TO EARTH (mm)	1300	320
3	SECTIONAL CLEARANCE (mm)	4000	2800
4	EQUIPMENT INTERCONNECTION HEIGHT (mm)	4600	3700
5	BUS HEIGHT (mm)	8000	---
6	JACK BUS HEIGHT (mm)	12000	---
7	EARTH WIRE TERMINATION (mm)	15500	9000

BILL OF QUANTITY - 33kV NEUTRAL BUS: (PART OF NEUTRAL FORMATION)

SR. NO.	ITEM DESCRIPTION	RATING	LEGEND	LOA QTY.	ENGG. QTY.
1	HV-NEUTRAL BUS POST INSULATOR FOR ICT BAY (HV-BPI)	33kV, OUTDOOR TYPE		LS	03 NOS.
2	LV-NEUTRAL HIGH BUS POST INSULATOR FOR ICT BAY (LV-HBPI)	33kV, OUTDOOR TYPE		LS	04 NOS.
3	BUS REACTOR NEUTRAL BUS POST INSULATOR (BPI)	33kV, OUTDOOR TYPE		LS	04 NOS.

Rev. No.	Date	Description	Prepared	Checked	Approved
R5	22.10.2021	REVISED TO UPDATE 5MVAr REACTOR GA AS PER VENDOR DRAWINGS	ARUL	ISS	DB
R4	08.09.2020	REVISED AS PER PGCIL COMMENTS DATED 04.09.20	ARUL	ISS	DB
R3	26.08.2020	REVISED TO UPDATE 5MVA TRANSFORMER, 5MVAr REACTOR, LT TRANSFORMER GA & 33kVISOLATOR AS PER VENDOR DRAWING	ARUL	ISS	DB
R2	10.06.2019	REVISED AS PER COMMENTS RECEIVED FROM PGCIL SITE VIA MAIL DATED 24.04.19 & 03.06.19 AND MEETING DATED 24.05.19	SK	AD	DB
R1	28.02.2019	REVISED AS PER PGCIL COMMENTS DATED 20.02.19	SK	DB	DB

PROJECT:
CC-CS/165-NER/SS-3767/3/G4/NOA-I/7648 & CC-CS/165-NER/SS-3767/3/G4/NOA-II/7649 BOTH DATED 09.04.2018 (SUPPLY & ERECTION) FOR SUBSTATION PACKAGE SS01B UNDER COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION & DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH

EMPLOYER'S CONSULTANT:
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

CONTRACTOR:
TATA PROJECTS LTD.
TOWER-1, FIRST FLOOR, OKAYA CENTER, PLOT NO. B-5 SECTOR-62, NOIDA

TITLE:
OVERALL SUBSTATION LAYOUT PLAN AND SECTION FOR 132kV/33kV GERUKAMUKH SUBSTATION

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

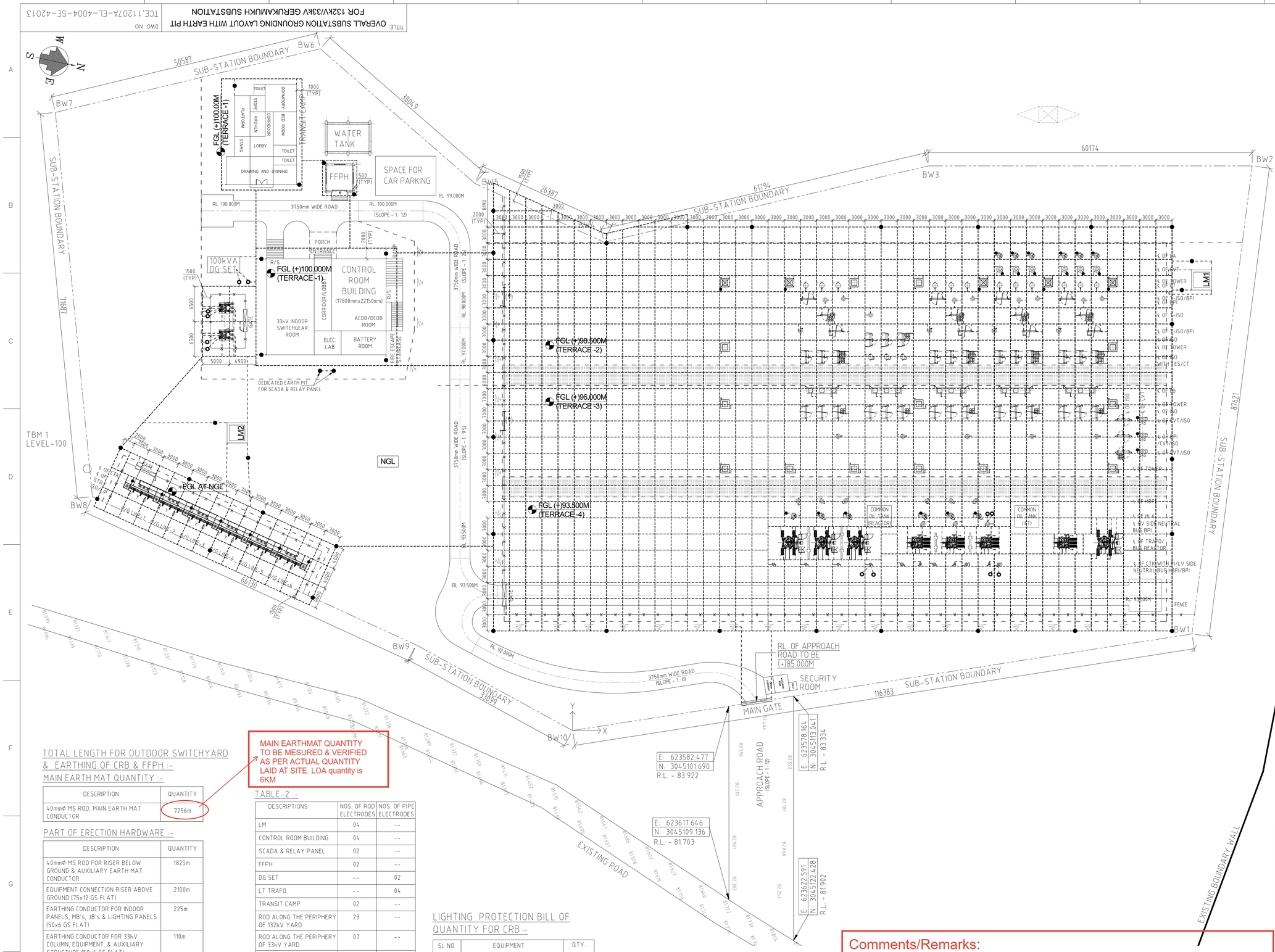
SCALE: 1:350	APPROVED		DATE (R0 ISSUE) 30.01.2019
DEL.CENTRE-DISC: EL			DATE (CURRENT ISSUE) 22.10.2021
Prepared By: SK			SH. NO. 1 OF 2
Checked By: AD			
Approved By: DB	DWG NO TCE.11207A-EL-4004-GA-42001		ISSUE R5

SIZE-A1

Overall Substation Grounding Layout With Earth Pit

TITLE: OVERALL SUBSTATION GROUNDING LAYOUT WITH EARTH PIT FOR 132kV/33kV GERUKAMUKH SUBSTATION

DWG NO: TCE.11207A-EL-4004-SE-42013



KEY PLAN
(NTS)

LEGEND :-

- 40mmø MS ROD, MAIN EARTH MAT
- 75x12mm GS FLAT RISER
- 50x6mm GS FLAT RISER
- FENCE
- BOUNDARY WALL
- 3m ROD ELECTRODE (UNTREATED EARTH PIT)
- 3m PIPE ELECTRODE (TREATED EARTH PIT) USED FOR POWER TRAFO., BUS REACTOR, LT TRAFO. & DG SET
- AUXILIARY EARTHING MAT (900mm x 900mm)

NOTES :-

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. EARTHING CONDUCTOR LAYOUT SHOWN IS DIAGRAMMATIC. LOCATION OF EARTHING CONDUCTOR, EARTH ELECTRODES & TEST PITS MAY BE CHANGED TO SUIT SITE CONDITIONS.
3. THE EARTHMAT SHALL BE LAID AT THE DESIGNED DEPTH OF 600mm BELOW GROUND LEVEL WITH A NORMAL (DESIGNED) SPACING OF 3.0m BETWEEN MAT CONDUCTORS ON BOTH DIRECTIONS.
4. THE SIZES OF EARTHING CONDUCTORS & EARTH ELECTRODES SHALL BE AS BELOW.
   (I) MAIN EARTHMAT CONDUCTOR MATERIAL :- MILD STEEL ROD
   (II) MAIN GROUND GRID CONDUCTOR SIZE :- 40mmø
   (III) RISER CONDUCTOR FOR EQPT. & STRUCTURE :- 75x12mm GS FLAT
   (IV) RISER CONDUCTOR FOR MB, JB & BMK :- 50x6mm GS FLAT
   (V) RISER CONDUCTOR FOR 33kV COLUMN, EQPT & AUX. STRUCTURE :- 50x6mm GS FLAT
   (VI) ROD ELECTRODES :- 40mmø, 3m LONG, MS ROD
   (VII) PIPE ELECTRODES :- 40mmø, 3m LONG, MS PIPE
5. THE ELECTRODE FOR TRANSFORMER NEUTRAL AND LIGHTNING ARRESTERS SHALL BE LOCATED AS NEAR TO EQUIPMENT AS POSSIBLE.
6. CONTINUOUS RUNNING OF EARTHMAT SHALL BE FORMED AS REQUIRED WITH STRAIGHT JOINTS OF STANDARD LENGTH OF EARTH FLATS. SUCH STRAIGHT JOINTS SHALL BE MADE WITH A MINIMUM OVER LAP EQUAL TO THE WIDTH OF THE FLAT. THE OVERLAP PORTION SHALL BE WELDED ON ALL FOUR SIDES BY CONTINUOUS WELDING AND A THICK COAT OF ANTI BITUMINOUS PAINT TO BE APPLIED.
7. ALL NON CURRENT CARRYING METAL PARTS SUCH AS BODY OF TRANSFORMERS, CIRCUIT BREAKERS, OUTDOOR STRUCTURES, ISOLATOR STRUCTURE ETC ARE TO BE DIRECTLY CONNECTED TO THE EARTHMAT USING GS FLATS WITH TWO DISTINCT CONNECTIONS RUN IN OPPOSITE DIRECTIONS.
8. ALL EARTH CONNECTIONS FROM EQUIPMENT / CAST IRON PIPE ELECTRODE TO THE EARTHMAT SHALL BE MADE USING GS FLATS AND ALL EARTH CONNECTIONS ARE TO BE DIRECTLY CONNECTED TO THE MAIN MAT.
9. OPERATING HANDLES OF ISOLATORS ARE TO BE CONNECTED TO GS FLAT EARTH CONDUCTOR USING BRAIDED FLEXIBLE CONDUCTOR.
10. WHENEVER EARTH CONDUCTORS CROSSING CABLE TRENCHES UNDER GROUND SERVICES DUCTS, PIPE TUNNELS, ROADS ETC, IT SHALL BE LAID MIN 300MM BELOW THEM AND SHALL BE REROUTED IN CASE IT FOULS WITH EQUIPMENT /STRUCTURE FOUNDATION.
11. EARTH PIT LOCATION SHOWN IN THE DIAGRAM IS DIAGRAMMATIC ONLY. THE ELECTRODE AND EARTH ROD LOCATION SHALL BE CHANGED SLIGHTLY TO SUIT SITE CONDITION.
12. ALL EQUIPMENT /STRUCTURES SHALL BE EARTHED BY MINIMUM TWO EARTHING LEADS OF 75x12mm GS FLAT.
13. 50x6mm MS FLAT SHALL RUN ON THE TOP TIER AND ALONG THE CABLE TRENCHES AND THE SAME SHALL BE WELDED TO EACH OF THE RACKS. FURTHER THIS FLAT SHALL BE EARTHED AT BOTH ENDS AND AT AN INTERVAL OF 30 M.
14. FOR EQUIPMENT/STRUCTURE EARTHING REFER STANDARD EARTHING DETAILS - DWG. NO. C/ENG/STD/EARTHINGS/09.
15. MINIMUM DISTANCE OF 6000mm SHALL BE MAINTAINED BETWEEN TWO TREATED (PIPE) ELECTRODE.
16. EARTHING CONDUCTOR SHALL BE BURIED 2M OUTSIDE THE SWITCHYARD FENCE.
17. AUXILIARY EARTH MAT(900mmX900mm)COMPRISING OF 40mm DIA MS ROD SHALL BE PROVIDED AT THE DEPTH OF 300mm FROM FGL BELOW OPERATING HANDLE OF MOM BOX OF ISOLATOR.
18. ALL EQUIPMENTS, TOWERS, PANEL, GATE, FENCE ETC., SHALL BE EARTHED AS PER TS, SWITCHYARD ERECTION , REV-10.

ENGINEERING REFERENCE DRAWING/DOCUMENT:

1. OVERALL SUBSTATION LAYOUT PLAN AND SECTION FOR 132kV/33kV GERUKAMUKH SUBSTATION - TCE.11207A-EL-4004-GA-42001
2. STANDARD EARTHING DETAILS - C/ENG/STD/EARTHINGS/09

TOTAL LENGTH FOR OUTDOOR SWITCHYARD & EARTHING OF CRB & FFPH :-

MAIN EARTH MAT QUANTITY :-

DESCRIPTION	QUANTITY
40mmø MS ROD, MAIN EARTH MAT CONDUCTOR	7256m

MAIN EARTHMAT QUANTITY TO BE MESURED & VERIFIED AS PER ACTUAL QUANTITY LAID AT SITE. LOA quantity is 6KM

PART OF ERECTION HARDWARE :-

DESCRIPTION	QUANTITY
40mmø MS ROD FOR RISER BELOW GROUND & AUXILIARY EARTH MAT CONDUCTOR	1825m
EQUIPMENT CONNECTION RISER ABOVE GROUND (75x12 GS FLAT)	2100m
EARTHING CONDUCTOR FOR INDOOR PANELS, MB's, JB's & LIGHTING PANELS (50x6 GS FLAT)	225m
EARTHING CONDUCTOR FOR 33kV COLUMN, EQUIPMENT. & AUXILIARY STRUCTURE (50x6 GS FLAT)	110m
CABLE TRENCH EARTHING (50x6 MS FLAT)	435m

NO. OF ROD & PIPE ELECTRODE :-

TABLE-1 :-

VOLTAGE LEVEL	NOS. OF ROD ELECTRODES			NOS. OF PIPE ELECTRODES	
	LA	CVT	TOWERS WITH PEAK	132/33kV ICT	BUS REACTOR
132kV	12	09	05	04	02
33kV	--	--	07	--	--
(a) TOTAL	33			06	

TABLE-2 :-

DESCRIPTIONS	NOS. OF ROD ELECTRODES	NOS. OF PIPE ELECTRODES
LM	04	--
CONTROL ROOM BUILDING	04	--
SCADA & RELAY PANEL	02	--
FFPH	02	--
DG SET	--	02
LT TRAFO.	--	04
TRANSIT CAMP	02	--
ROD ALONG THE PERIPHERY OF 132kV YARD	23	--
ROD ALONG THE PERIPHERY OF 33kV YARD	07	--
(b) TOTAL	42	06
GRAND TOTAL ((a)+(b))	77	12
TOTAL NO. OF ELECTRODES	77 + 12 = 89	

LIGHTING PROTECTION BILL OF QUANTITY FOR FFPH:-

SL NO.	EQUIPMENT	QUANTITY FFPH
1	25x3mm GI STRIP	35 mtr.
2	FIXING CLAMP (EPOXY INSULATOR)	25 NOS.
3	1 METER LONG 20mmø SPIKE	2 NOS.
4	TEST JOINT LINK	2 NOS.

LIGHTING PROTECTION BILL OF QUANTITY FOR CRB:-

SL NO.	EQUIPMENT	QTY.
1	25x3mm GI STRIP	145 mtr.
2	FIXING CLAMP (EPOXY INSULATOR)	130 NOS.
3	1 METER LONG 20mmø SPIKE	4 NOS.
4	TEST JOINT LINK	4 NOS.

LIGHTING PROTECTION BILL OF QUANTITY FOR TRANSIT CAMP:-

SL NO.	EQUIPMENT	QTY.
1	25x3mm GI STRIP	75 mtr.
2	FIXING CLAMP (EPOXY INSULATOR)	75 NOS.
3	1 METER LONG 20mmø SPIKE	2 NOS.
4	TEST JOINT LINK	2 NOS.

BILL OF QUANTITY FOR LM:

SL NO.	EQUIPMENT	QTY.
1	LIGHTNING MAST (50 METERS)	2 NOS.

TABLE FOR LM (LIGHTNING MAST) LOCATIONS:

SL NO.	LM NO.	CO-ORDINATES (IN METER)	
		X	Y
1	LM1	116.791	83.676
2	LM2	-62.289	55.278

Comments/Remarks:
1) THE EARTHMAT LAYOUT IS DESIGNED CONSIDERING 20kA FAULT LEVEL. LAYOUT TO BE REVIEWED WHEN FAULT LEVEL EXCEEDS 20KA IN FUTURE.
2) EARTHING OF TRANSFORMERS/REACTORS, EQUIPMENTS, TOWERS/STRUCTURES, FENCE , SWITCHYARD GATE ETC. TO BE DONE AS PER POWRGRID SPECIFICATION.

REV	DATE	DESCRIPTION	DRN	CHK	APP
R1	18.02.2021	REVISED AS PER PGCIL COMMENTS DATED 23.09.2019	ARUL	DB	DB

PROJECT:
CC-CS/165-NER/SS-3767/3/G4/NOA-I/7648 & CC-CS/165-NER/SS-3767/3/G4/NOA-II/7649 BOTH DATED 09.04.2018 (SUPPLY & ERECTION) FOR SUBSTATION PACKAGE SS01B UNDER COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION & DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH

EMPLOYER'S CONSULTANT:
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

CONTRACTOR:
TATA PROJECTS LTD.
TOWER-1, FIRST FLOOR, OKAYA CENTER, PLOT NO. B-5 SECTOR-62, NOIDA

TITLE:
OVERALL SUBSTATION GROUNDING LAYOUT WITH EARTH PIT FOR 132kV/33kV GERUKAMUKH SUBSTATION

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE:	1:350	APPROVED	DATE (R0 ISSUE) 09.09.2019
DEL.CENTRE-DISC:			DATE (CURRENT ISSUE) 18.02.2021
Prepared By:	SK		SH. NO. 1 OF 1
Checked By:	AD		
Approved By:	DB	DWG NO TCE.11207A-EL-4004-SE-42013	ISSUE R1

SIZE-A1

Substation Automation System (SAS)

SWITCHYARD CONTROL ROOM

ETHERNET HUB
ETHERNET HUB
24" DISPLAY
24" DISPLAY
24" DISPLAY
24" DISPLAY
24" DISPLAY
ANTENNA

HMI-MAIN IPC-610
N/W NAME-OISERVM
IP ADDRESS-10.22.91.1

EWS/DR IPC-610
N/W NAME-EWS
IP ADDRESS-10.22.91.3

HMI-STANDBY IPC-610
N/W NAME-OISERVB
IP ADDRESS-10.22.91.2

GPS MC-1
N/W NAME-GPS
IP ADDRESS-10.22.91.100

BCU C264
N/W NAME-BAUX
IP ADDRESS-10.22.91.21

SERVER-MAIN IPC-610
N/W NAME-SERVM
IP ADDRESS-10.22.91.10

SERVER-STBY. IPC-610
N/W NAME-SERVS
IP ADDRESS-10.22.91.11

LASERJET PRINTER
DMP-1
DMP-2

MFM LOOP-1 FROM 33kV BOARD
MFM LOOP-2 FROM 33kV BOARD

MAIN LINK TO RLDC ON IEC-104
MAIN LINK TO NTAMC ON IEC-104
MAIN LINK TO BNTAMC ON IEC-104
MAIN LINK TO RTAMC ON IEC-104
MAIN LINK TO RLDC ON IEC-104
MAIN LINK TO NTAMC ON IEC-104
MAIN LINK TO BNTAMC ON IEC-104
MAIN LINK TO RTAMC ON IEC-104

ROUTER CUM FIREWALL-1
ROUTER CUM FIREWALL-2

LDC. GTW-MAIN IPC-610
N/W NAME-GTWM
IP ADDRESS-10.22.91.4

LDC. GTW-STBY. IPC-610
N/W NAME-GTWS
IP ADDRESS-10.22.91.5

REM. GTW-MAIN IPC-610
N/W NAME-GTWM
IP ADDRESS-10.22.91.6

REM. GTW-STBY. IPC-610
N/W NAME-GTWS
IP ADDRESS-10.22.91.7

LINK TO RLDC ON IEC-104
LINK TO NTAMC ON IEC-104
LINK TO BNTAMC ON IEC-104
LINK TO RTAMC ON IEC-104

LINK FROM REMOTE 33/11kV DISTRIBUTION STATION ON IEC-104

EFS-A1 MAR1120
N/W NAME-EFS_A1
IP ADDRESS-10.22.91.6

EFS-A2 MAR1120
N/W NAME-EFS_A2
IP ADDRESS-10.22.91.7

2KVA INVERTER-1
2KVA INVERTER-2

LIU-1

100MBPS IEC-61850 STATION RING-ARMOURED FIBER OPTIC CABLE

LIU-2

132kV GIS RELAY ROOM

EFS-B1 MAR1120
N/W NAME-EFS_B1
IP ADDRESS-10.22.91.101

EFS-B2 MAR1120
N/W NAME-EFS_B2
IP ADDRESS-10.22.91.102

EFS-B3 MAR1120
N/W NAME-EFS_B3
IP ADDRESS-10.22.91.103

BAY-101 132kV LIKABALI LINE
PANEL REF: +G1R1

21M1 P442
N/W NAME-R10121
IP ADDRESS-10.22.91.20

BCU C264
N/W NAME-B101L1
IP ADDRESS-10.22.91.21

67/67N P141
N/W NAME-R10167N
IP ADDRESS-10.22.91.22

BAY-102 132kV NAHARLAGUN LINE
PANEL REF: +G1R2

21M1 P442
N/W NAME-R10221
IP ADDRESS-10.22.91.23

BCU C264
N/W NAME-B102L2
IP ADDRESS-10.22.91.24

67/67N P141
N/W NAME-R10267N
IP ADDRESS-10.22.91.25

BAY-103 132/33kV ICT-1
PANEL REF: +G1R3A,+G1R3B

87T P643
N/W NAME-R10387T
IP ADDRESS-10.22.91.26

67HV P141
N/W NAME-R10367HV
IP ADDRESS-10.22.91.27

BCU C264
N/W NAME-B103TR1
IP ADDRESS-10.22.91.28

64HV P141
N/W NAME-R10364HV
IP ADDRESS-10.22.91.29

64LV P141
N/W NAME-R10364LV
IP ADDRESS-10.22.91.30

BAY-104 132kV TBC
PANEL REF: +G1R4

BCU C264
N/W NAME-B104TBC
IP ADDRESS-10.22.91.31

BAY-106 132kV BUS REACTOR
PANEL REF: +G1R5

87R P643
N/W NAME-R10587R
IP ADDRESS-10.22.91.32

BCU C264
N/W NAME-B105BR
IP ADDRESS-10.22.91.33

64R P141
N/W NAME-R10564R
IP ADDRESS-10.22.91.34

21R P442
N/W NAME-R10521R
IP ADDRESS-10.22.91.35

BAY--- 132kV BUSBAR
PANEL REF: +G1BB

87 P741
N/W NAME-R1B887
IP ADDRESS-10.22.91.36

LIU-4

TRAFO MB-YARD SIDE
LIU-5

ODS ACM-100
N/W NAME-R103ODS
IP ADDRESS-10.22.91.120

33kV RELAY ROOM

LIU-3

EFS-B4 MAR1120
N/W NAME-EFS_B4
IP ADDRESS-10.22.91.104

TO AUX BCU LINK-1

LT TR. FDR.1 REF620
N/W NAME-R331
IP ADDRESS-10.22.91.36

OG FDR.1 REF615
N/W NAME-R332
IP ADDRESS-10.22.91.37

OG FDR.2 REF615
N/W NAME-R333
IP ADDRESS-10.22.91.38

OG FDR.3 REF615
N/W NAME-R334
IP ADDRESS-10.22.91.39

INC.1 REF615
N/W NAME-R335
IP ADDRESS-10.22.91.40

BC REF615
N/W NAME-R336
IP ADDRESS-10.22.91.41

INC.2 REF615
N/W NAME-R337
IP ADDRESS-10.22.91.42

OG FDR.4 REF615
N/W NAME-R338
IP ADDRESS-10.22.91.43

OG FDR.5 REF615
N/W NAME-R339
IP ADDRESS-10.22.91.44

OG FDR.6 REF615
N/W NAME-R340
IP ADDRESS-10.22.91.45

LT TR. FDR.2 REF620
N/W NAME-R341
IP ADDRESS-10.22.91.46

MFM

TO AUX BCU LINK-2

LEGEND

- MULTI MODE FIBER OPTIC CABLE(6-CORE)(MAIN-LINK)
- MULTI MODE FIBER OPTIC CABLE(6-CORE)(REDUNDANT-LINK)
- FIBER OPTIC PATCH CORD (MM)(MAIN-LINK)
- FIBER OPTIC PATCH CORD (MM)(REDUNDANT-LINK)
- RS-485 CABLE
- RS-232 CABLE
- CUSTOMER SUPPLIED FOR DATA TRANSMISSION TO RLDC ON IEC-60870-101
- F1 100MBPS FIBER OPTIC PORT(ST)
- T1 100MBPS ETHERNET PORT(RJ45)
- S1 RS-485 MODBUS LINK

NOTE:
1. SUPPLY OF 33kV SWITCHBOARD IEDs ARE OUT OF GE SCOPE OF SUPPLY.HARDWARE FOR INTEGRATING THE SAME IN THE PROPOSED SCADA IS CONSIDERED.
2.COMMUNICATION CHANNEL TO RLDC/SRLDC IS OUT OF GE SCOPE OF SUPPLY.
3.IEC-104 GATEWAY ARE CONSIDERED FOR INTEGRATING 33/11kV DISTRIBUTION SYSTEM IEDs.
4.FOR SAS SIZING PURPOSE, 5 NOS. DISTRIBUTION STATIONS WITH 10 IEDs EACH HAVE BEEN CONSIDERED IN SCOPE.

PROJECT: **SUBSTATION PACKAGE SS01B UNDER COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION AND DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH.**

OWNER: DEPARTMENT OF POWER,GOVERNMENT OF ARUNACHAL PRADESH(DPAP)

CONSULTANT: POWER GRID CORPORATION OF INDIA LIMITED

ASSOCIATE CONSULTANT: TATA PROJECTS LIMITED

CONTRACTOR: GE T&D India Ltd. (Formerly Alstom T&D India Ltd.) Grid Automation-Pallavaram India

TITLE : SYSTEM ARCHITECTURE

DRAWING NO. KY4H-PG-SA(GERUKHAMUKH)

SIGNED BY	DATE	NAME	SIGNATURE
DRAWN	18.11.2020	PLS	
CHECKED	18.11.2020	JKK	
APPROVED	18.11.2020	SSS	

NOA NO.: CC-CS/165-NER/SS-3763/3/G4/NOA-I/7648 CC-CS/165-NER/SS-3763/3/G4/NOA-II/7649

SCALE : STANDARD : I E C

SIZE NA REVISION: B SH.NO. 001 QTY. OF SHEET: 2

Communication Panel Specification

Document Control

Version History

Every change to this document is logged in the table below

Version :	A
Date:	
Author:	Rohit Pandey
Description:	:- DRS For Rack

Tejas Networks Ltd. Gurgaon

TEJAS NETWORKS

Name Of Document:	DATA REQUIREMENTS SHEETS for Cabinets

Manufacturer: Apex Luminaires Pvt Ltd

Seq. No.	Parameter	Particulars
1	Protection Class (IP Class)	As per IP41 H2200X W600mmX D600mm for equipment
2	Rack Colour & Finish	Glossy white inside and Light Grey(RAL7035) out side
3	Describe Ventilation requirements	As per IP 41 requirements Dia 8 mm holes - 91 Nos.
4	Describe dust proofing provisions	As per IP 41 requirements
5	Sheet details: Material Thickness	Cold Rolled Cold Annealed 2.0 mm
6	Weight	H2200mmX W600mmX D600mm=96 KG(approx)
7	Grounding Arrangement	Provided, Copper earth bus bar
8	Mounting details	a. Grouting to the floor in the buildings. b. It can support C Rails mounting arrangement for the shelters c. It can support galvanized U channels mounting arrangement over the trenches in substation
9	Cable Entry details	cable entry gland plate at the bottom & cable entry holes in the top
10	Door Details. Hinged(Yes/No) Rubber Beading(Yes/No) Locking arrangement Front	 Yes yes 3 locks / door for protection & tight sealing and Limit Switch for intrusion alarm Front will include a glass panel of 5 mm thick and it will be toughened glass (For visualization of alarms)
11	Clearness Top Bottom Side	 200mm 100mm 100mm
12	IP41 certificate reference for H2200mmX W600mmX D400mm	IP41 compliance certificate available -do-
13	Installation arrangement equipment subracks	Mounting in 19" frame
14	cooling arrangement	forced cooling through two 115 CFM DC 48V fans installed in fan tray

End Of Table

NOA Ref. .....

Tejas 08.01.2020

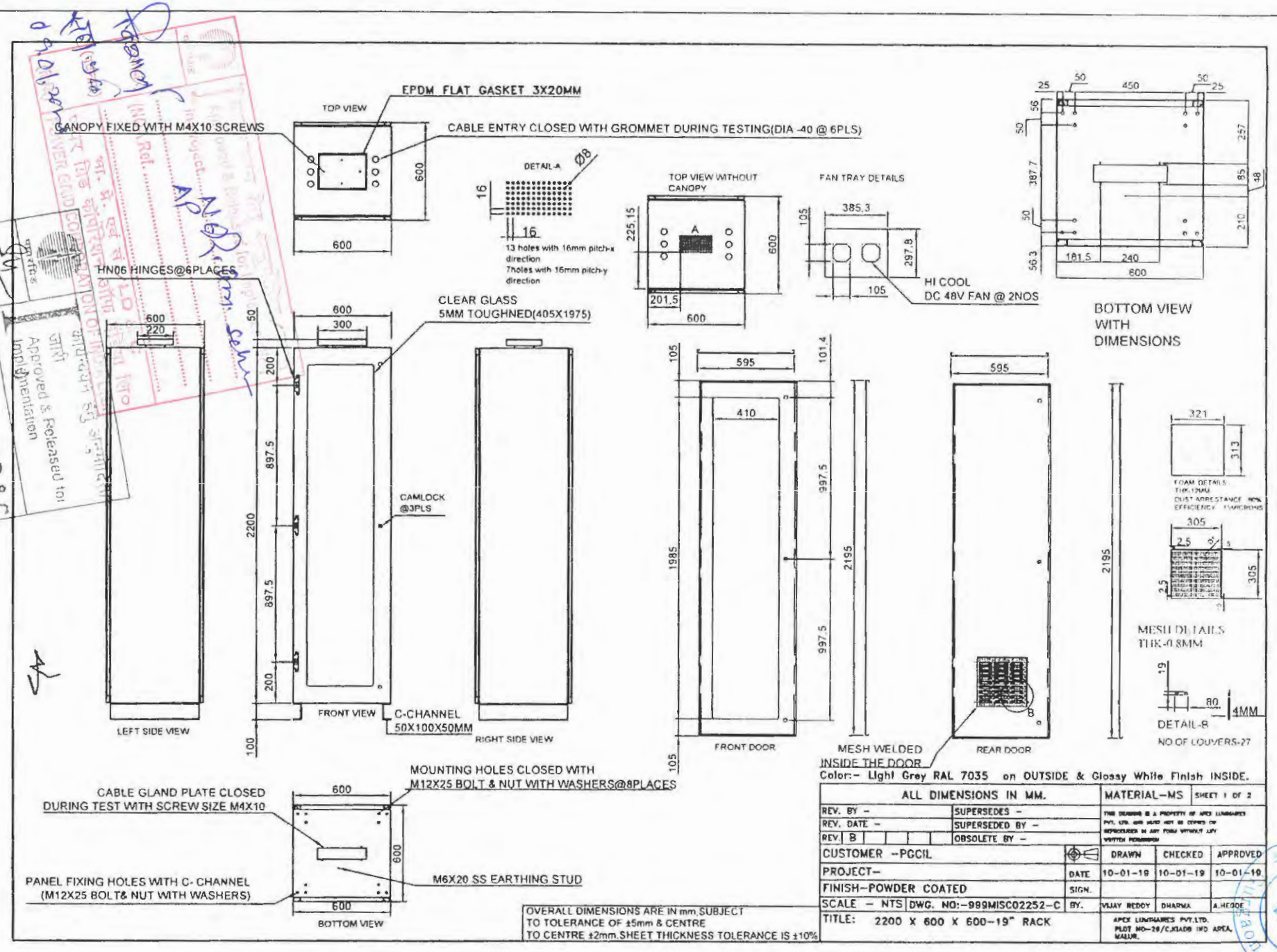
NAR-COMM P.Sch

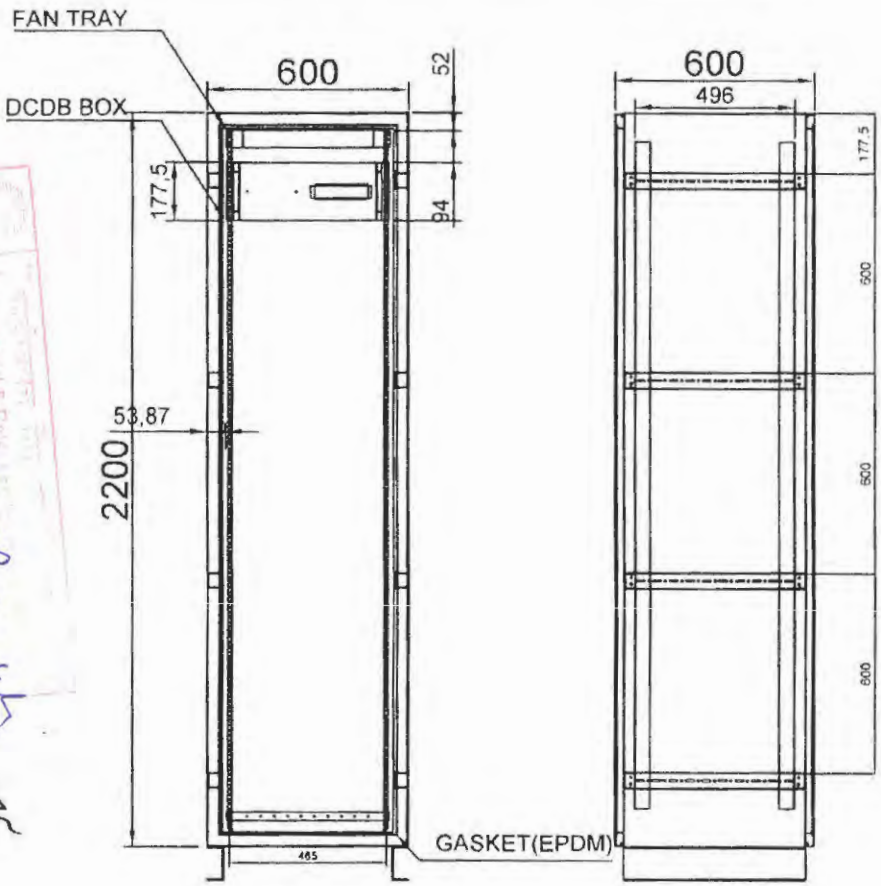
AP

कार्यान्वयन हेतु अनुमोदित/जारी
Approved & Released for Implementation
एल.डी. एवं सी. / LD & C
पावर ग्रिड कारपोरेशन ऑफ इंडिया लि.
POWER GRID CORPORATION OF INDIA LTD

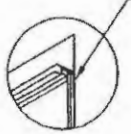
(हस्ता./Sign.)
(पदनाम/Desig.)
15.5.19
(तारीख/Date)

Tejas Networks Ltd. Gurgaon


EPDM FLAT GASKET 3X20MM
TOP VIEW
CANOPY FIXED WITH M4X10 SCREWS
CABLE ENTRY CLOSED WITH GROMMET DURING TESTING(DIA -40 @ 6PLS)
600
DETAIL-A
Ø8
16
16
13 holes with 16mm pitch-x direction
7holes with 16mm pitch-y direction
TOP VIEW WITHOUT CANOPY
225.15
201.5
FAN TRAY DETAILS
385.3
297.8
105
HI COOL DC 48V FAN @ 2NOS
HN06 HINGES@6PLACES
CLEAR GLASS 5MM TOUGHNED(405X1975)
600
300
220
200
897.5
2200
CAMLOCK @3PLS
100
LEFT SIDE VIEW
FRONT VIEW
C-CHANNEL 50X100X50MM
RIGHT SIDE VIEW
595
410
1985
997.5
2195
FRONT DOOR
REAR DOOR
MESH WELDED INSIDE THE DOOR
BOTTOM VIEW WITH DIMENSIONS
321
313
FOAM DETAILS THK-12MM
305
MESH DETAILS THK-0.8MM
DETAIL-B
4MM
NO OF LOUVERS-27
CABLE GLAND PLATE CLOSED DURING TEST WITH SCREW SIZE M4X10
MOUNTING HOLES CLOSED WITH M12X25 BOLT & NUT WITH WASHERS@8PLACES
PANEL FIXING HOLES WITH C- CHANNEL (M12X25 BOLT& NUT WITH WASHERS)
M6X20 SS EARTHING STUD
BOTTOM VIEW
OVERALL DIMENSIONS ARE IN mm,SUBJECT TO TOLERANCE OF ±5mm & CENTRE TO CENTRE ±2mm,SHEET THICKNESS TOLERANCE IS ±10%
Color:- Light Grey RAL 7035 on OUTSIDE & Glossy White Finish INSIDE.
ALL DIMENSIONS IN MM.
MATERIAL-MS
SHEET 1 OF 2
REV. BY –
REV. DATE –
REV. B
SUPERSEDES –
SUPERSEDED BY –
OBSOLETE BY –
CUSTOMER –PGCIL
PROJECT–
FINISH–POWDER COATED
SCALE – NTS
DWG. NO:–999MISC02252–C
TITLE: 2200 X 600 X 600–19" RACK
DRAWN
CHECKED
APPROVED
DATE
SIGN.
BY.
10-01-19
VIJAY REDDY
DHARMA
A.HEGDE
APEX LUMINAIRES PVT.LTD.
PLOT NO–28/C,KIADB IND AREA, MALUR.



EPDM TOP BOBBLE GASKET
(STEEL SPRING CORE NO-02)-12.5X8MM



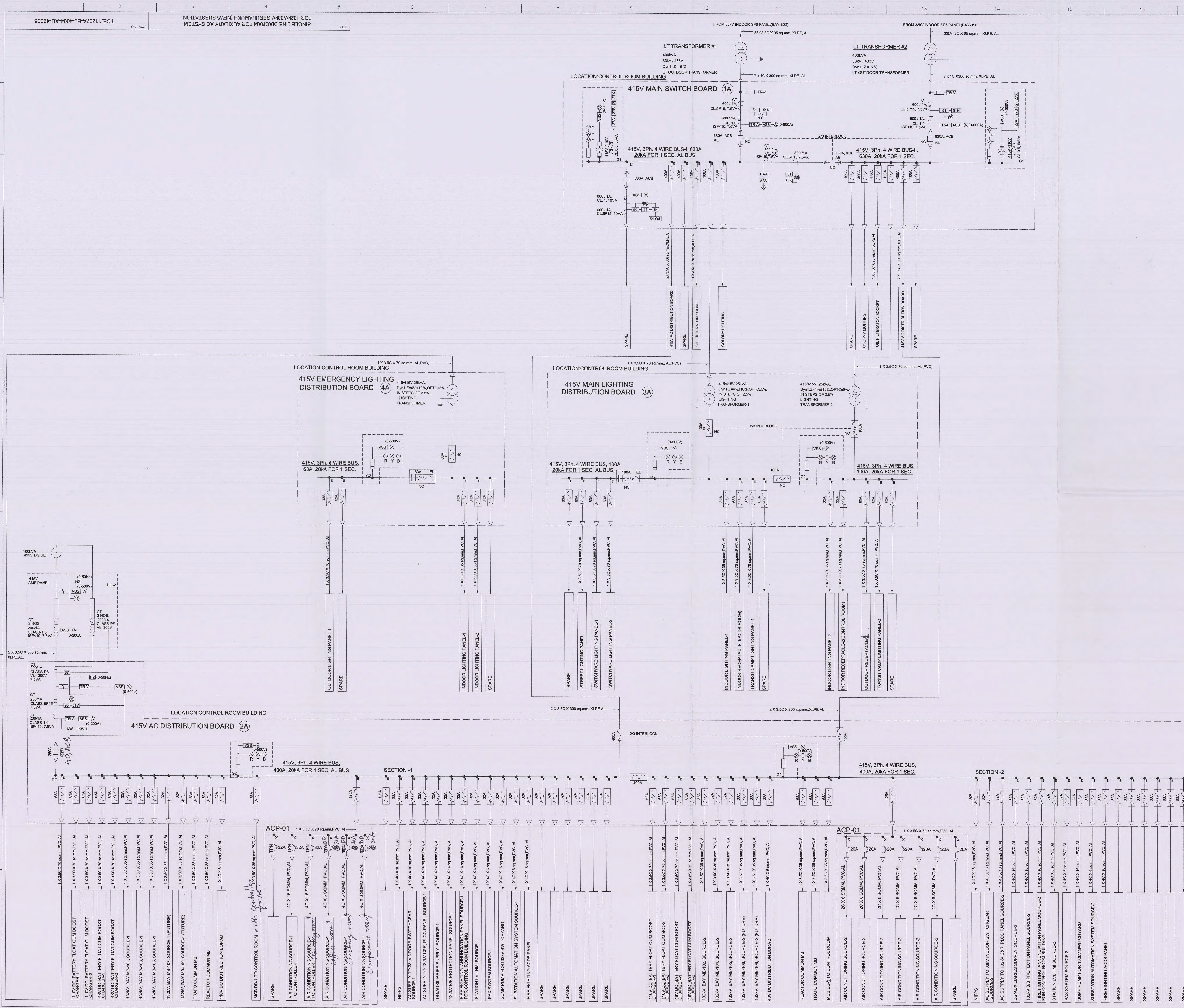
Tejas Networks Ltd. Gurgaon

OVERALL DIMENSIONS ARE IN mm,SUBJECT TO TOLERANCE OF ±5mm & CENTRE TO CENTRE ±2mm,SHEET THICKNESS TOLERANCE IS ±10%

Color:- Light Grey RAL 7035 on OUTSIDE & Glossy White Finish INSIDE.

ALL DIMENSIONS IN MM.			MATERIAL-MS	SHEET 1 OF 2	
REV. BY -	SUPERSEDES -				
REV. DATE -	SUPERSEDED BY -				
REV. B	OBSOLETE BY -				
CUSTOMER -PGCIL			DRAWN	CHECKED	APPROVED
PROJECT-		DATE	10-01-19	10-01-19	10-01-19
FINISH-POWDER COATED		SIGN.			
SCALE - NTS	DWG. NO:-999MISC02252-C	BY.	VIJAY REDDY	DHARMA	A.HEGDE
TITLE: 2200 X 600 X 600-19" RACK			APEX LUMINAIRES PVT.LTD. PLOT NO-26/C,KIADB IND AREA, MALUR.		

Single Line Diagram for Auxiliary AC System (Marked with feeders to be used for present scope



LEGENDS:

- AIR CIRCUIT BREAKER
- FOUR POLE MCCB
- TWO POLE AC MCB
- AIR BREAK SWITCH
- HRC FUSE
- ⊗ INDICATION
- POTENTIAL TRANSFORMER
- CURRENT TRANSFORMER
- Ⓐ AMMETER
- Ⓥ VOLTMETER
- ASS AMMETER SELECTOR SWITCH
- TR-V VOLTAGE TRANSDUCER
- TR-A CURRENT TRANSDUCER
- EFR EARTH FAULT RELAY
- VSS VOLTAGE SELECTOR SWITCH
- KW KILOWATT METER
- KWH KILOWATT HOUR METER
- Hz FREQUENCY METER
- 27 UNDER VOLTAGE RELAY
- 59 OVER VOLTAGE RELAY
- 95 MOTOR OVER CURRENT RELAY
- 96 EARTH LEAKAGE RELAY
- 2 TIMER
- 50 INSTANTANEOUS OVER CURRENT RELAY
- 64 RESTRICTED EARTH FAULT RELAY
- 87 DIFFERENTIAL RELAY
- 50N INSTANTANEOUS EARTH FAULT RELAY
- 51N IDMT EARTH FAULT OVER CURRENT RELAY
- 51 IDMT OVER CURRENT RELAY
- NO NORMALLY OPEN
- NC NORMALLY CLOSED
- 86 HIGH SPEED TRIPPING RELAY

NOTES:

1. NO TWO AC SOURCE SHALL BE PARALLELED AT ANY STAGE.
2. DG SET SHALL BE OF AUTO START TYPE.
3. INTERLOCKING OF BREAKER SHALL BE PROVIDED TO PREVENT PARALLEL OPERATION OF DG SET WITH NORMEL STATION SUPPLY.
4. 1PH & 3PH AC SUPPLY FOR ALL THE BAY EQUIPMENTS SHALL BE FED FROM THE BMK.
5. EACH BAY MB AND TRANSFORMER MB SHALL BE FED BY ATLEAST ONE SOURCE FROM ACDB. SECOND SOURCE SHALL BE LOOPED FROM NEAREST BAY MB & TRANSFORMER MB WHICH SHALL BE FED FROM ANOTHER FROM 415V ACDB.
6. AUTOMATIC SUPPLY CHANGE OVER SHALL BE ACHIEVED AS PER TECHNICAL SPECIFICATION, SECTION-LT SWITCHGEAZ A R.

ENGINEERING REFERENCE DRAWING

1. SINGLE LINE DIAGRAM 132/33kV GERUKAMUKH (NEW) SUBSTATION -TCE-XXXXX-EL-1006-AU-40003
2. SINGLE LINE DIAGRAM FOR AC & DC SYSTEM FOR 220kV &132kV NEW SUBSTATION - C/ENGG/NER/AC/SLD/01

Rev. No.	Date	Description	Prepared	Checked	Approved

CLIENT: DEPARTMENT OF POWER, GOVERNMENT OF ARUNACHAL PRADESH (DPAP)

CONSULTANT: POWER GRID CORPORATION OF INDIA LIMITED (A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT: CC-CS/165-NER/SS-3767/3/G4/NOA-I/7648 & CC-CS/165-NER/SS-3767/3/G4/NOA-II/7649 BOTH DATED 09.04.2018 (SUPPLY & ERECTION) FOR SUBSTATION PACKAGE SS01B UNDER COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION & DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH

ASSOCIATE CONTRACTOR: TATA PROJECTS LTD. TOWER-1, FIRST FLOOR, OKAYA CENTER, PLOT NO. B-5 SECTOR-62, NOIDA

CONTRACTOR CONSULTANT: TATA CONSULTING ENGINEERS LIMITED MUMBAI

TITLE: SINGLE LINE DIAGRAM FOR AUXILARY AC SYSTEM FOR 132kV/33kV GERUKAMUKH (NEW) SUBSTATION

SCALE:	NTS	APPROVED	DATE (R0 ISSUE) 27.03.2019
DEL.CENTRE-DISC:	EL		DATE (CURRENT ISSUE) 27.03.2019
Prepared By:	NPK		SH. NO. 1 OF 1
Checked By:	AD		
Approved By:	DB	DWG NO TCE.11207A-EL-4004-AU-42005	ISSUE R0

TATA PROJECTS LIMITED

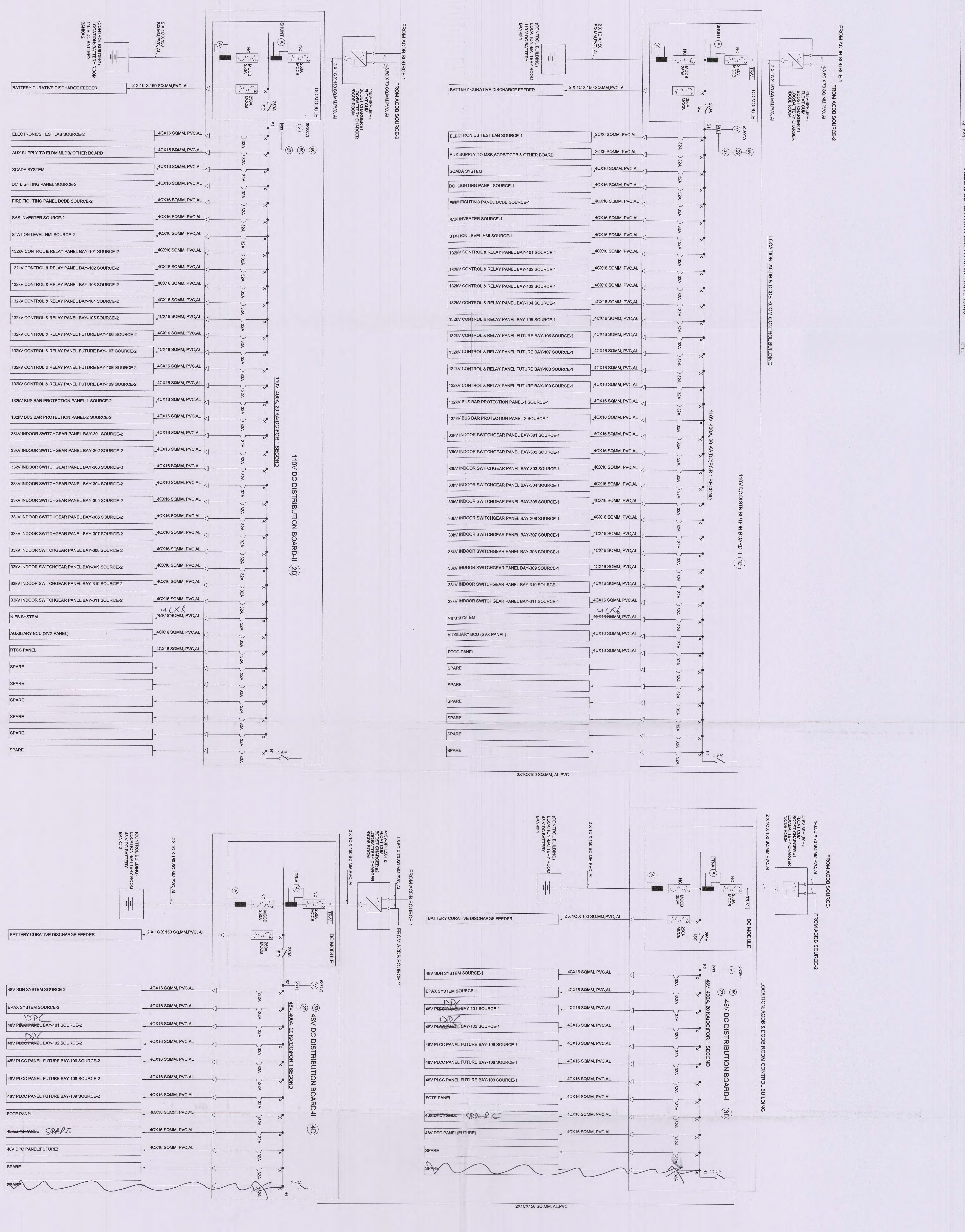
आदेश / निर्माण / हेतु अनुमोदित / जारी । कोड्स / निर्माण / हेतु अनुमोदित / जारी । शर्तों की गई टिप्पणियों एवं आपत्तियों को संशोधित किया जाए / संशोधित करें। दस्तावेज़ अनुमोदन नहीं। पावर ग्रिड कारपोरेशन ऑफ इंडिया लि (परामर्श) / (अभियांत्रिकी) गुड़गांव, हरियाणा

SIZE-A0

FILE NAME: F-090-Rev-R0.dwg

TITLE: SINGLE LINE DIAGRAM FOR AUXILARY AC SYSTEM FOR 132kV/33kV GERUKAMUKH (NEW) SUBSTATION DWG NO TCE.11207A-EL-4004-AU-42005

Single Line Diagram for Auxiliary DC System
(Marked with feeders to be used for present scope)



LEGENDS:

	AIR CIRCUIT BREAKER
	FOUR POLE MCCB
	TWO POLE MCCB
	AIR BREAK SWITCH
	HRC FUSE
⊗	INDICATION
	POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
Ⓐ	AMMETER
Ⓥ	VOLTMETER
ASS	AMMETER SELECTOR SWITCH
TR-V	VOLTAGE TRANSDUCER
TR-A	CURRENT TRANSDUCER
EFR	EARTH FAULT RELAY
VSS	VOLTAGE SELECTOR SWITCH
KW	KILOWATT METER
KWH	KILOWATT HOUR METER
Hz	FREQUENCY METER
27	UNDER VOLTAGE RELAY
59	OVER VOLTAGE RELAY
95	MOTOR OVER CURRENT RELAY
96	EARTH LEAKAGE RELAY
2	TIMER
50	INSTANTANEOUS OVER CURRENT RELAY
64	RESTRICTED EARTH FAULT RELAY
87	DIFFERENTIAL RELAY
50N	INSTANTANEOUS EARTH FAULT RELAY
51N	IDMT EARTH FAULT OVER CURRENT RELAY
51	IDMT OVER CURRENT RELAY
NO	NORMALLY OPEN
NC	NORMALLY CLOSED

NOTES:

1. NO TWO AC SOURCE SHALL BE PARALLED AT ANY STAGE.
2. DG SET SHALL BE AUTO START TYPE.
3. ALL DIGITAL/ANALOG INPUT/OUTPUTS REQUIRED FOR SAS SYSTEM SHALL BE CONSIDERED BY THE LT SWITCHGEAR MANUFACTURER.

ENGINEERING REFERENCE DRAWING

1. SINGLE LINE DIAGRAM 132/33kV GERUKAMUKH NEW SUBSTATION -TCE-XXXXX-EL-1006-AU-40003
2. SINGLE LINE DIAGRAM FOR AC & DC SYSTEM FOR 220kV &132kV NEW SUBSTATION - C/ENGG/NER/AC/SLD/01

Rev. No.	Date	Description	Prepared	Checked	Approved

CLIENT:
DEPARTMENT OF POWER, GOVERNMENT OF ARUNACHAL PRADESH (DPAP)

CONSULTANT:
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT:
CC-CS/165-NER/SS-3767/3/G4/NOA-I/7648 & CC-CS/165-NER/SS-3767/3/G4/NOA-II/7649 BOTH DATED 09.04.2018 (SUPPLY & ERECTION) FOR SUBSTATION PACKAGE SS01B UNDER COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION & DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH

ASSOCIATE CONTRACTOR:
TATA PROJECTS LTD.
TOWER-1, FIRST FLOOR, OKAYA CENTER, PLOT NO. B-5 SECTOR-62, NOIDA

CONTRACTOR CONSULTANT:
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

TITLE:
SINGLE LINE DIAGRAM FOR AUXILARY DC SYSTEM FOR 132KV/33KV GERUKAMUKH (NEW) SUBSTATION

SINGLE LINE DIAGRAM FOR AUXILIARY DC SYSTEM 132/33kV GERUKAMUKH (NEW) SUBSTATION

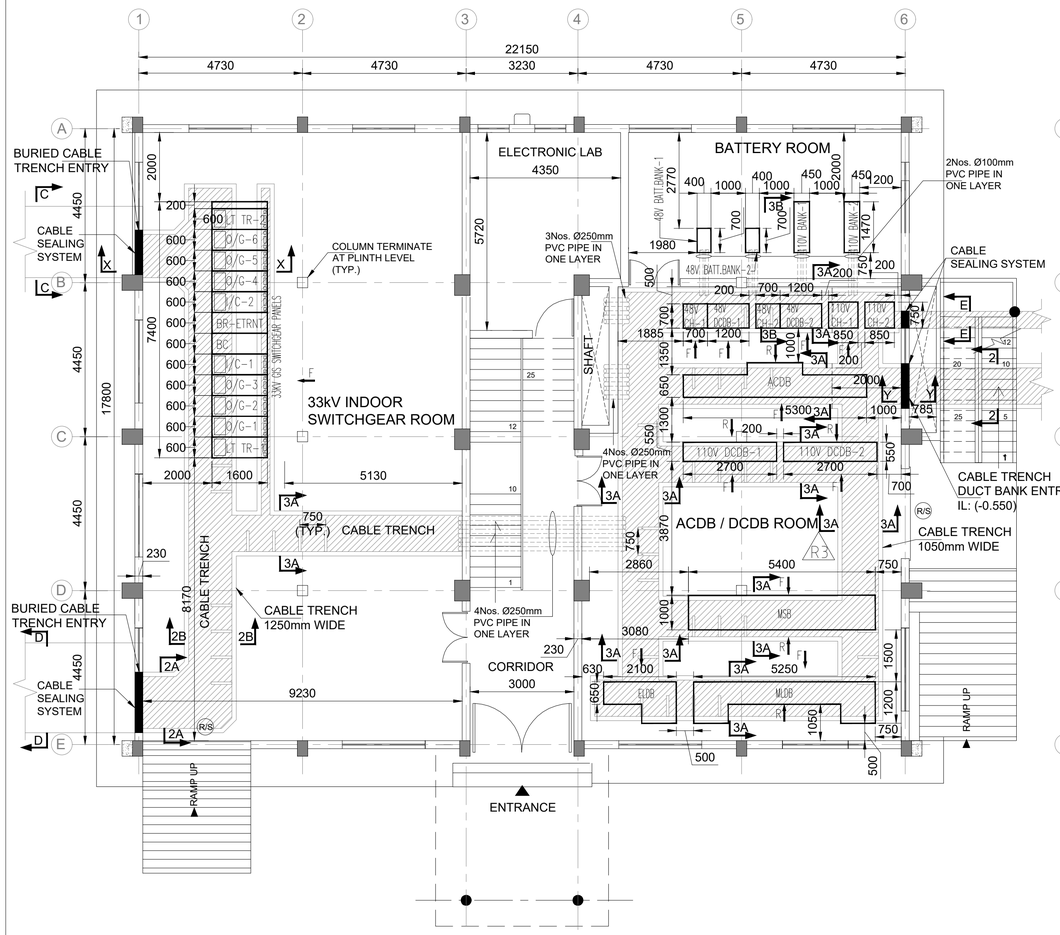
DWG NO. TCE.11207A-EL-4004-AU-42006

SCALE: NTS | APPROVED | DATE (R0 ISSUE) 27.03.2019

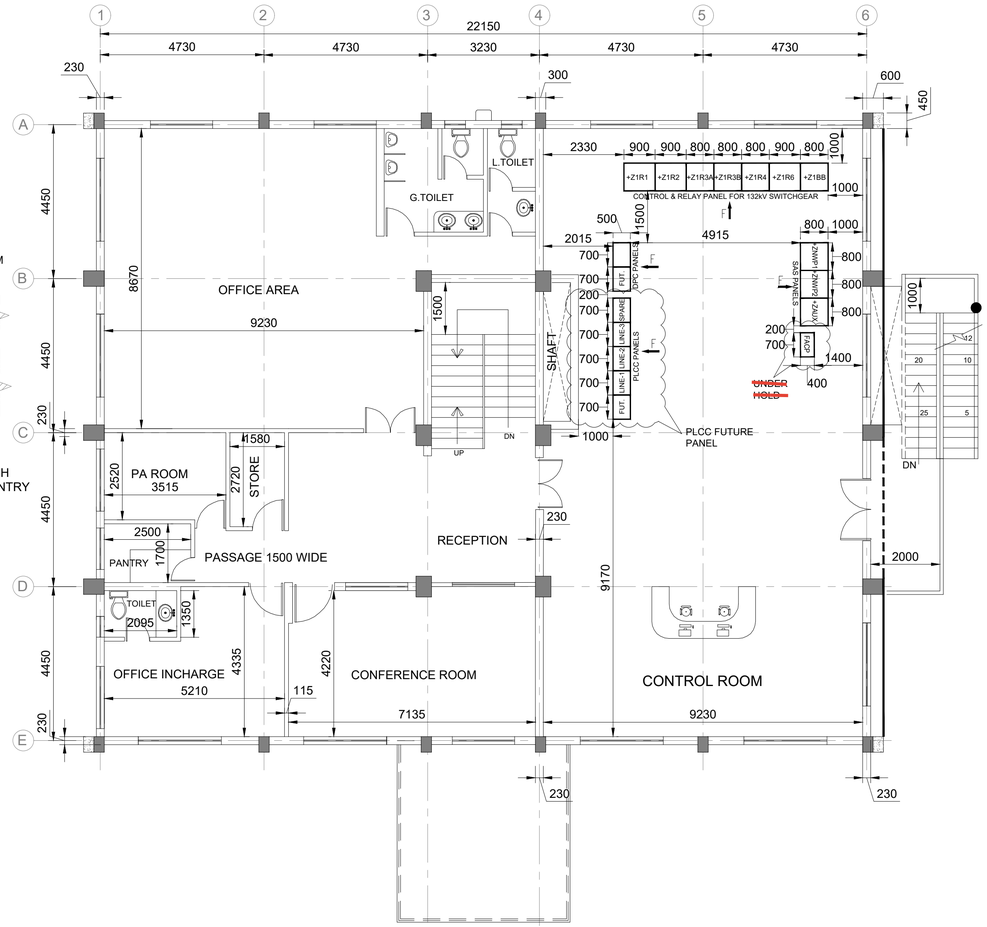
Panel Arrangement Layout Drawing

TITLE: PANEL ARRANGEMENT LAYOUT DRAWING FOR CONTROL ROOM BUILDING FOR 132KV/33KV ZIRO (NEW) SUBSTATION

DWG NO TCE.11207A-EL-4004-GA-40008



GROUND FLOOR PLAN



FIRST FLOOR PLAN

EQUIPMENT DETAILS:-

SR.NO.	EQUIPMENT DESCRIPTION	EQUIPMENT DIMENSION (LxBxH) IN (mmXmmXmm)
1	33kV GIS SWITCHGEAR	7400 x 1600 x 2900
2	MAIN SWITCHBOARD (MSB)	5400 x 1000 x 2375
3	AC DISTRIBUTION BOARD (ACDB)	5300 x 1000 x 2375
4	MAIN LIGHTING DISTRIBUTION BOARD (MLDB)	5250 x 1200 x 2375
5	EMERGENCY LIGHTING DISTRIBUTION BOARD (ELDB)	2100 x 1200 x 2375
6	PLCC PANEL	700 x 500 x 2100
7	DPC PANEL	700 x 500 x 2100
8	SAS PANEL	800 x 800 x 2315
9	CONTROL PANEL FOR 132kV SWITCHGEAR	800 / 900 x 800 x 2315
10	FIRE ALARM CONTROL PANEL	700 x 400 x 2375
11	110V DCDB-1	2700 x 550 x 2375
12	110V DCDB-2	2700 x 550 x 2375
13	110V CHARGER-1	850 x 750 x 1600
14	110V CHARGER-2	850 x 750 x 1600
15	48V BATTERY CHARGER CUM. DCDB-1	1900 x 700 x 2200
16	48V BATTERY CHARGER CUM. DCDB-2	1900 x 700 x 2200
17	110V BATTERY BANK-1	1470x450x1245
18	110V BATTERY BANK-2	1470x450x1245

Location is fixed. Tata to place FCAP panel suitably at site

UNDER HOLD

EQUIPMENT DETAILS:-

SR.NO.	EQUIPMENT DESCRIPTION	EQUIPMENT DIMENSION (LxBxH) IN (mmXmmXmm)
19	48V BATTERY BANK-1	700x400x760
20	48V BATTERY BANK-2	700x400x760

132kV CONTROL & PROTECTION PANEL DETAILS:-

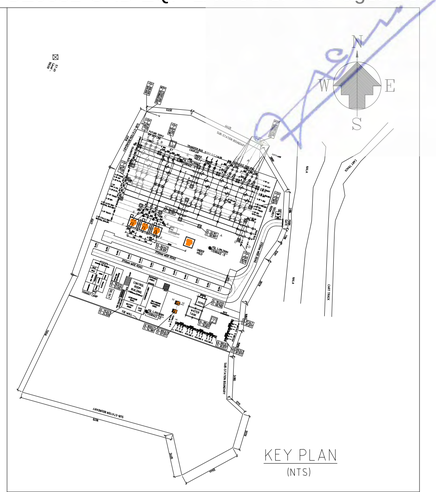
SR.NO.	PANEL TAG	PANEL DESCRIPTION
1	+Z1R1	132kV ZIRO LINE-1 PROTECTION & CONTROL BAY-1
2	+Z1R2	132kV ZIRO LINE-2 PROTECTION & CONTROL BAY-2
3	+Z1R3A	132/33kV TRANSFORMER PROTECTION & CONTROL BAY-3
4	+Z1R3B	132/33kV TRANSFORMER PROTECTION & CONTROL BAY-3
5	+Z1R4	132/33kV TRANSFER BUS COUPLER PROTECTION & CONTROL BAY-4
6	+Z1R6	132kV PALIN LINE-3 PROTECTION & CONTROL BAY-6
7	+Z1BB	BUSBAR PROTECTION

132kV SAS PANEL DETAILS:-

SR.NO.	PANEL TAG	PANEL DESCRIPTION
1	+ZNWP1	NETWORK PANEL
2	+ZNWP2	NETWORK PANEL
3	+ZAUX	AUXILIARY PANEL

FIRE ALARM PANEL DETAILS:-

SR.NO.	PANEL TAG	PANEL DESCRIPTION
1	FACP	FIRE ALARM CONTROL PANEL



LEGEND

ACDB - AC DISTRIBUTION BOARD
DCDB - DC DISTRIBUTION BOARD
MSB - MAIN SWITCH BOARD
MLDB - MAIN LIGHTING DISTRIBUTION BOARD
ELDB - EMERGENCY LIGHTING DISTRIBUTION BOARD
CH - BATTERY CHARGER
FACP - FIRE ALARM & CONTROL PANEL

NOTES

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
2. THE EXACT LOCATION OF CONTROL ROOM BUILDING SHALL BE REFERRED FROM ELECTRICAL LAYOUT PLAN.
3. UNUSED OPENING/SPARE CONDUITS ETC., SHALL BE SEALED PROPERLY& MADE WATER PROOF.
4. FOR CIVIL DETAILS OF CONTROL ROOM BUILDING & DOOR AND WINDOW SCHEDULE ETC. REFER SEPARATE DRAWING.
5. CONTROL ROOM SHALL HAVE FALSE FLOORING.
6. WITHIN THE CONTROL BUILDING THE INVERT LEVEL OF ALL TRENCHES SHALL BE ADJUSTED TO MAINTAIN A SLOPE OF 1:1000.
7. CABLE SEALING SHALL BE PROVIDED IN EACH CABLE TRENCH/BURRIED ENTRY.
8. CABLE SUPPORTS SHALL BE PROVIDED AT EVERY 750mm. SUPPORTS LOCATION SHALL BE ADJUSTED AS PER SITE CONDITION.
9. WHEREVER TRENCH CROSSING TO PLINTH BEAM PIPE SLEEVES SHALL BE PROVIDED. R3
10. CABLE SEALING SYSTEM WILL BE AS PER APPROVED VENDOR DRAWING
11. FOR CABLE TRENCH SECTION NO. C-C, D-D, E-E & 2-2 REFER SWITCHYARD OUTDOOR CABLE TRENCH LAYOUT DRAWING NO. TCE.11207A-EL-4004-CT-40014

ENGINEERING REFERENCE DRAWING

1. ELECTRICAL LAYOUT PLAN AND SECTION OF 132kV/33kV ZIRO (NEW) SUBSTATION -TCE-11207A-EL-1006-GA-40003
2. CONTROL ROOM BUILDING WITH INDOOR SWITCHGEAR ROOM - C/ENGG/STD/220/132/33kV/CRB/ARCH/003&004
3. SWITCHYARD CABLE TRENCH LAYOUT ZIRO (NEW) SUBSTATION -TCE.11207A-EL-4004-CT-40014

Rev. No.	Date	Description	Prepared	Checked	Approved
R3	05.11.2020	REVISED AS PER PGCIL COMMENTS DTD. 19.10.2020	ARUL	DB	DB
R2	05.10.2020	REVISED AS PER PGCIL COMMENTS DTD. 17.09.2020	ARUL	DB	DB
R1	26.08.2020	REVISED TO UPDATE 132kV CONTROL RELAY PANEL, PLCC, 110V,48V BATTERY BANK & CHARGER AS PER VENDER DRAWING.	ARUL	ISS	DB

CLIENT: DEPARTMENT OF POWER, GOVERNMENT OF ARUNACHAL PRADESH (DPAP)

CONSULTANT: POWER GRID CORPORATION OF INDIA LIMITED (A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT: CC-CS/165-NER/SS-3767/3/G4/NOA-I/7648 & CC-CS/165-NER/SS-3767/3/G4/NOA-II/7649 BOTH DATED 09.04.2018 (SUPPLY & ERECTION) FOR SUBSTATION PACKAGE SS01B UNDER COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION & DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH

ASSOCIATE CONTRACTOR: TATA PROJECTS LTD. TOWER-1, FIRST FLOOR, OKAYA CENTER, PLOT NO. B-5 SECTOR-62, NOIDA

CONTRACTOR CONSULTANT: TATA CONSULTING ENGINEERS LIMITED MUMBAI

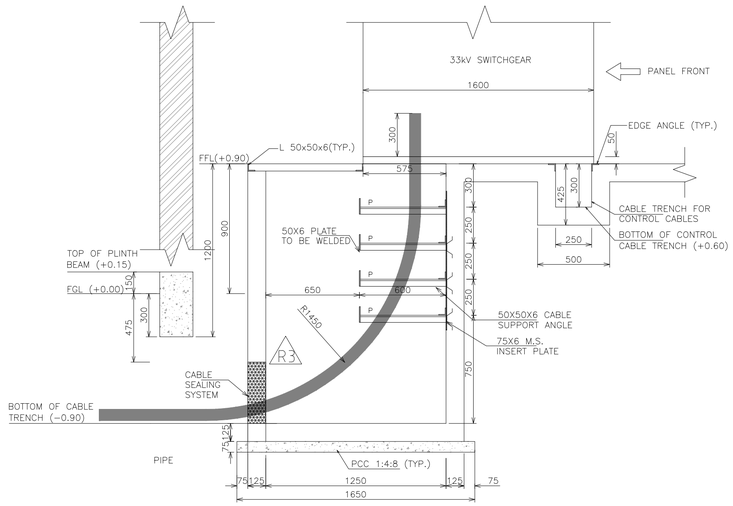
TITLE: PANEL ARRANGEMENT LAYOUT DRAWING FOR CONTROL ROOM BUILDING FOR 132kV/33kV ZIRO (NEW) SUBSTATION

SCALE: 1:125	APPROVED	DATE (R0 ISSUE)	22-05-2020
DEL.CENTRE-DISC:		DATE (CURRENT ISSUE)	05-11-2020
Prepared By: ASB	--	SH. NO.	1 OF 2
Checked By: ASB	Head - Engineering / Project Director		
Approved By: DB	DWG NO TCE.11207A-EL-4004-GA-40008	ISSUE	R3

SIZE-A2

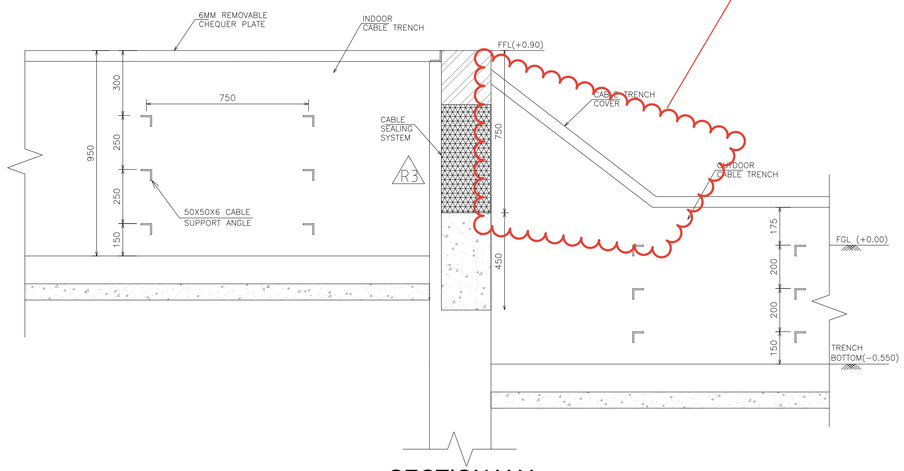
TITLE: PANEL ARRANGEMENT LAYOUT DRAWING FOR CONTROL ROOM BUILDING FOR 132KV/33KV ZIRO (NEW) SUBSTATION

DWG NO TCE.11207A-EL-4004-GA-40008

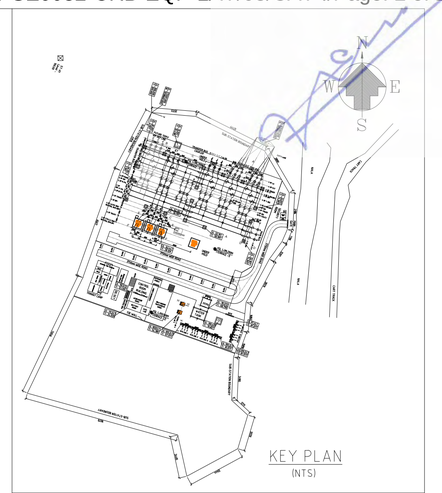


SECTION X-X

M/s Tata to take care of trench cover for this portion of cable trench & the arrangement of this portion shall be shown in the cable trench drawing separately.



SECTION Y-Y



LEGEND

ACDB	-	AC DISTRIBUTION BOARD
DCDB	-	DC DISTRIBUTION BOARD
MSB	-	MAIN SWITCH BOARD
MLDB	-	MAIN LIGHTING DISTRIBUTION BOARD
ELDB	-	EMERGENCY LIGHTING DISTRIBUTION BOARD
CH	-	BATTERY CHARGER
FACP	-	FIRE ALARM & CONTROL PANEL

NOTES

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9. WHEREVER TRENCH CROSSING TO PLINTH BEAM PIPE SLEEVES SHALL BE PROVIDED CLEARING THE BEAM. R3
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11. FOR CABLE TRENCH SECTION NO. C-C, D-D, E-E & 2-2 REFER SWITCHYARD OUTDOOR CABLE TRENCH LAYOUT DRAWING NO. TCE.11207A-EL-4004-CT-40014

ENGINEERING REFERENCE DRAWING

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2. CONTROL ROOM BUILDING WITH INDOOR SWITCHGEAR ROOM - C/ENGG/STD/220/132/33kV/CRB/ARCH/003&004
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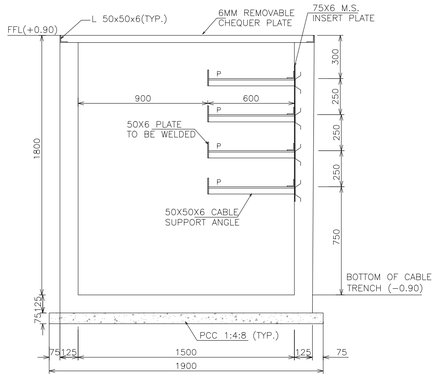
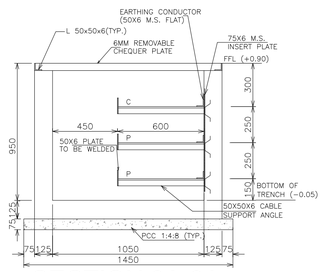
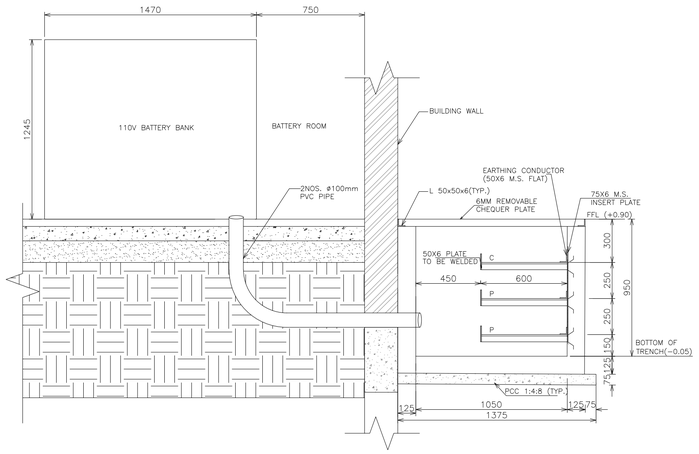


SECTION 2A-2A



SECTION 3A-3A



SECTION 3B-3B

Rev. No.	Date	Description	Prepared	Checked	Approved
R3	05.11.2020	REVISED AS PER PGCIL COMMENTS DTD. 19.10.2020	ARUL	DB	DB
R2	05.10.2020	REVISED AS PER PGCIL COMMENTS DTD. 17.09.2020	ARUL	DB	DB
R1	26.08.2020	REVISED TO UPDATE 132kV CONTROL RELAY PANEL, PLCC, 110V, 48V BATTERY BANK & CHARGER AS PER VENDER DRAWING.	ARUL	ISS	DB

CLIENT:
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CONSULTANT:
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SECTOR-62, NOIDA

CONTRACTOR CONSULTANT:
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

TITLE:
PANEL ARRANGEMENT LAYOUT DRAWING FOR CONTROL ROOM BUILDING FOR 132kV/33kV ZIRO (NEW) SUBSTATION

SCALE: 1:125	APPROVED		DATE (R0 ISSUE) 22-05-2020
DEL.CENTRE-DISC:			DATE (CURRENT ISSUE) 05-11-2020
Prepared By: ASB	--	--	SH. NO. 2 OF 2
Checked By: ASB	Head - Engineering	Project Director	
Approved By: DB	DWG NO TCE.11207A-EL-4004-GA-40008		ISSUE R3

SIZE-A2